



## RESEARCH ARTICLE

EVALUATION OF CARIES ACTIVITY AMONG SIBLINGS  
USING ORA TEST

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**ABSTRACT:**

**Background:** Among several dental disorders the prevalence of the dental caries remains even high in developing countries. The etiology of the dental caries is multifactorial and its prevalence varies accordingly for each individual from childhood to adults through adolescence. Several caries activity tests were used for the disease and helps in monitoring and motivation of patients with dental caries. **Aims and Objectives:**The aim of this study is to evaluate the activity of caries among siblings using a chair side caries activity test Ora test and whether it can be used as a diagnostic tool for assessing caries. **Materials and methodology:**40 siblings aged 6-12 years was divided into 2 groups 20 each Group-I including elder children Group-II including younger children. Group-I and Group II included two subgroups A(boys) and B (girls). All the subjects were allowed to rinse their oral cavity with cow's milk less than 3% fat and the samples collected were stained with methylene blue and observed for color changes and time taken for each sample for detectable color changes were recorded. **Results:**The results showed that the time taken for color change was more in elder siblings i.e.  $119.65 \text{ min} \pm 24.30$  suggesting a higher resistance when compared to younger individuals i.e.,  $44.90 \text{ min} \pm 8.49$  who showed a decrease time periods for color change indicating more caries susceptibility. **Conclusion:** Caries activity is more among younger siblings when compared to elder siblings and ora test is a reliable chair side caries activity test for estimating oral microbial microorganisms leading to caries.

**Key Words:** Caries, Ora Test, Caries Activity, Streptococcus mutans.

**INTRODUCTION**

Caries, one of the man's most common and oldest disorder is unique and ubiquitous [1]. Such dental caries cannot only be detected by visual and tactile examination due to its complex progression. Several tests for caries activity were developed to overcome this complexity [2]. The concept behind the activity of caries is based on specific odontogenic infection caused by



a key etiological microbe, *Streptococcus mutans* [3]. In the modern era of dentistry several tests for caries activity have been used in dentistry for years.

Caries activity is the speed with which teeth are destroyed by caries [4]. Several researches on activity of caries have targeted on finding the causative microbes. Till date ideal method which is reliable had not been reported. The activity tests for caries developed so far requires specialized equipment, increased working time. Hence, several studies were aimed regarding the activity test for caries without consuming much time and which does not demand any skilled professional, so that they can be used in community based oral screening programs[5]. A reliable estimate for oral microbial levels is provided by a simple chair side caries activity test Oratest. This test also motivates and monitors the efficacy of diet related educational programs. The principle of Ora test is based on microbial oxygen depletion rate

Aerobic dehydrogenase is a bacterial enzyme which transfers electrons or protons to oxygen. Methylene blue when added the aerobic microbes which utilized oxygen converts the environment to anaerobic and methylene blue reduces to leucomethylene blue acting as redox indicator. This reduction of methylene blue to leucomethylene indicates the metabolic activity of aerobic microbes[6]. This reduction can be easily observed because of white color of milk[6].

## MATERIALS & METHODOLOGY

Study was conducted on 40 siblings aged 6-12years randomly selected from those who reported to the Department of Pedodontics, Cks Theja Dental College, Tirupathi after obtaining informed consent from the parents. The study sample was divided into 2 groups 20 each Group-I including elder children Group-II including younger children. The groups were subdivided into Group-Ia elder Male group and Group-Ib elder Female group and Group-IIa younger Male and Group-IIb younger male groups. The criteria for selection of subjects include, dental caries involving one or more teeth, Gingival index score of zero (Loe and Silness index) Absence of abscess, draining sinus or cellulitis, absence of history of antibiotic for the past 1 month.



Oral screening(Fig:1)

Armamentarium(Fig:2)

Sample collect(Fig:3)

Armamentarium:

The armamentarium used were:

1. Sterile beakers
2. Sterilized Pasteurized milk (double-toned cow milk, 3% fat, pH 6.5)
3. Test tubes
4. 0.1% aqueous solution of methylene blue
5. 5 ml disposable syringes
6. Pipette
7. Mirror
8. Stopwatch
9. Test tube stand.



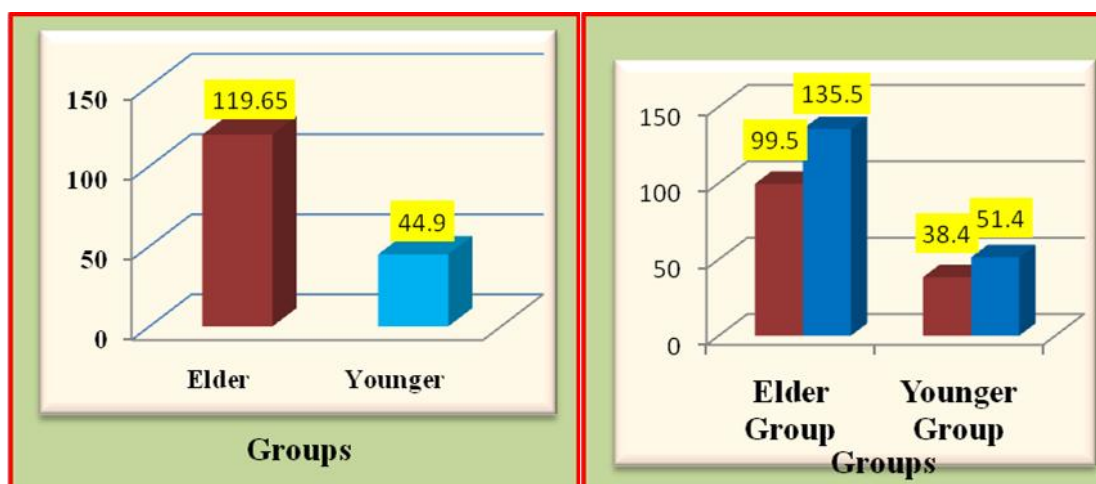
## METHOD

The subjects were made to rinse their mouth vigorously with 10 ml of pasteurized ultra -high temperature sterilized cow's milk 3% fat for 30 seconds. Later 3ml of the collected expectorate was transferred to test tube from sterile beaker with a disposable syringe and 0.12 ml of 0.1% methylene blue (0.1% of methylene blue was obtained by mixing 100 mg of methylene blue in 100ml of distilled water) was added to test tube and thoroughly mixed and test tube was set aside on a stand in well illuminated area. For every 5 minutes to detect any color change blue to white in the bottom of the test tube a mirror was used and within 6mm ring the time taken for color change was noted

## OBSERVATION AND RESULTS.

The mean time for the color change of methylene blue of Group-I was  $119 \text{ min} \pm 24.30$  with a higher value of 160 min and lower value 90 min and the mean color change for the Group II was  $44.9 \text{ min} \pm 8.49$  with a higher value of 55 min and lower value of 26 min. Comparison between the means of these two groups was found to be statistically significant [ $P=0.001$ ].

Among intra group comparisons, Group-Ia (elder boys) showed less time for color change i.e.,  $99.50 \pm 10.81$  when compared to Group-Ib (Elder Girls) i.e.,  $135.0 \pm 16.3$ , the mean difference of which was statistically significant ( $p$  value-0.001). Among Group-II Subgroup-IIa (younger boys) showed less time for color change  $38.4 \pm 7.07$  when compared to subgroup-IIb  $51.4 \pm 2.91$ . The Gingival index of the 40 subjects was negatively correlated with the time needed for initiation of color change.



MEAN ORA TEST OF 2 GROUPS

MEAN ORATEST OF SUBGROUPS

## DISCUSSION

Dental caries can be prevented by implementing preventive strategies among children with high risk of caries and for children with active carious lesions proven with susceptibility of caries [7]. Precise biomarkers for detecting activity of caries and risk of future caries are needed for early identification and non-invasive management of caries [8]. So far tests for caries activity were developed to detect high caries risk among caries susceptible individuals. Till date no caries activity test predicted caries with high degree of confidence and the reliability of those tests was limited because they could not represent microbial source and also needs extensive working time and specialized equipment [1].



In spite of having limitations several tests for caries activity were used by clinicians in taking several decisions for controlling caries activity, for planning the timing for recall appointments, for types of restorative procedures indicated, for materials used and for the determination of prognosis. These tests motivate patients and patient compliance can be easily determined with several regimes of treatment. A simple inexpensive technique which does not demand sophisticated skills or consume less chair side time helps to dictate caries status of individual so that individuals with increased caries risk are better served with appropriate clinical management [2].

The samples from the subjects were collected after a period of 1 and half hour from the last solid or liquid intake. Milk was selected for rinsing the mouth because it is considered as a suitable vehicle for dislodging microbes mildly but effectively. Milk is easily acceptable by children and also proven to be nontoxic and better medium for subsequent metabolism. Later methylene blue was added to expectorate and time taken for initiation of color change was recorded. The time taken for color changes was compared with deft/dmft values.

For the Group I, the time taken for color change was  $141 \text{ min} \pm 38$  and was  $31 \text{ min} \pm 7$  for the Group II. A statistically high significance was found when comparing the means of the 2 groups [ $t = -0.913$ ;  $P = 0.000$ ]. These findings were in agreement with the findings of Patalay, Anand [5,6] who performed Oratest on 50 children. They found the mean time taken for the color change was  $279.9 \text{ min} \pm 89.74$  in the control group and  $55.6 \text{ min} \pm 66.33$  for the test group. In the present study maximum time taken for color change [ $91 \text{ min} \pm 21$ ] was observed in children with 1-5 carious teeth and the minimum time taken for the color change [ $28 \text{ min} \pm 7$ ] was in children with 11-15 carious lesions. Similar findings were reported by Patalay and Anand [5,6].

Oratest lacks specificity and the microbial source cannot be identified by it. It may give positive results in gingival and periodontal diseases and this is considered as most important limitation of the test but the advantage of this test is it does not require specific equipment and can be easily skilled by auxiliaries in school dental health programmes for diagnosing dental caries. It can also aid in motivating the child and parent as the results can be easily visualised thus providing a baseline through which oral health and significant changes in clinical status can be monitored at chair-side.

Thus the current study hypothesized that children with increased microbial levels due to higher infection showed decreased time in the colour change of expectorate [3]. So Oratest can predict the demineralization activity of bacteria. The current study results show that the younger children showed increased activity of caries based upon the prevalence of caries. It also shows that the younger male children with equal number of lesions showed increased activity of caries when compared to elder female children. Similar results were obtained with higher experience of caries among boys than girls by Vacher [9] Auckland and Bhelkar [10] Gaikwad and Indurkar [11].

The prevalence of caries was greater among the children of younger age group when compared with elder age group children with primary dentition and first transition period due to high caries promoting environment [10] which correlated with the current study. Children of age group 5-6 yrs were found to have caries by 71.11% in comparison to higher age groups 8-13 yrs and this was due to good awareness regarding oral hygiene and additively it was also due to increased resistance of permanent teeth to caries [12]. The thoughts and ideas of family members also influence the caries risk to a greater extent [13]. Among the several variables associated with increasing caries risk sibling count plays a crucial role [10] stating that more sibling count increased caries activity among younger children [14].



**CONCLUSION:**

1. Younger siblings have higher activity of caries in comparison to elder siblings.
2. For estimation of levels of oral microbiota, Ora test serves as simple and reliable activity test for caries at chair side
3. The successful treatment of patients with caries can be facilitated by oratest as it determines necessity of personalised preventive measures
4. ora test also helps in monitoring and motivating several diet and oral health educational programs and particularly plays a major role in identifying individuals or group of individuals with high risk

**REFERENCES**

1. Zaidi I, Somani R, Jaidka S. In vivo effectiveness laser fluorescence compared to visual inspection and intraoral camera for detection occlusal caries. Indian J Dent Sci 2010;2(3):15-20.
2. Wyne AH, Guile EE. Caries activity indicators: A review. Indian J Dent Res 1993;4(2):39-46.
3. Studervant CM, Roberson TM, Heymann HO, Studervant JR. Editor. The Art and science of operative dentistry. 3rd ed. Mosby Co: 1995.p. 62-3.
4. Caries Activity Indicators: Guide for Dental Practitioners Tamgadge Sandhya, Tamgadge Avinash, Evie Satheesan
5. Munshi AK, Hedge AM, Munshi A. Relationship between the existing caries status, plaque S. mutans and Cariostat caries activity test in children. J Indian Soc Pedod Prev Dent. 1999; 17: 73-89.
6. S Bhasin, P Sudha, T Anegundi R. Chair side simple caries activity test: Ora test. J Indian Soc Pedod Prev Dent. 2006; 24: 76-9.
7. A comparative evaluation of Oratest with the microbiological method of assessing caries activity in children (J Pharm Bioallied Sci. 2013 Jun; 5(Suppl 1): S5-S9).
8. Explaining sex differences in dental caries prevalence: saliva, hormones and life-history etiologies American journal of human biology, 2006 July-August; 18(4):540-55.
9. Vacher BR. Dental survey of school children in Amritsar (Punjab). JIDA 1952;24:13
10. Aukland S, Bjelkaroe J. The dental health of school children in Betul district, Madhya Pradesh. JIDA 1982;54:367-69.
11. Gaikwad RS, Indurkar MS. Prevalence of dental caries in school going children of Aurangabad in the year, JIDA 1993;64:325-26.
12. Shetty NS, Tandon S. Prevalence of dental caries as related to risk factors in school children of South Kanara. J Ind Soc Ped and Prev Dent 1988;6:30-7.
13. Amrita Sujlana, Parampreet Kaur Pannu. Family related factors associated with caries prevalence in the primary dentition of five-year-old children Ind Soc Ped and Prev Dent 2015;33:issue-284.87.
14. Paula JS, Leite IC, Almeida AB, Ambrosano GM, Pereira AC, Mialhe FL. The influence of oral health conditions, socioeconomic status and home environment factors on school children's self-perception of quality of life. Health Qual Life Outcomes 2012;10:6.

**BIOGRAPHY**

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**Dr.Swathi.B** had obtained early education, Bachelor of Dental Surgery from CKS Theja institute of dental sciences and research, Andhrapradesh in the year 2007. Started independent career where she had worked as lecturer for training undergraduate students for two and half years in the same college where she had completed her graduation, parallelly running own private dental clinic for a period of 6 years upto 2013. She had started her post-graduation training programme in the year 2013, in the department of pedodontics and preventive dentistry for consecutive 3 years in CKS Theja institute of dental sciences and research, andhrapradesh. During this training tenure she had undertaken a research project to evaluate the level of caries activity among siblings as a part of preventive based community programs hosted by her respective department in CKS theja institute of dental sciences, Tirupathi ANDHRA PRADESH, under the guidance of her Prof and HOD. Dr.P.Prathyusha, MDS, Dr. K. V. Kishore kumar reddy, MDS, READER, Dr. K.Naveen kumar, MDS, READER in the department of Pedodontics and preventive dentistry.

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