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The Effect of 0.2% Sodium Fluoride Mouthwash Tablets in Prevention of Dental Caries

Lt. Col. Ashok A. Rathod,
Associate professor,
Armed forces dental clinic, New Delhi, majashokrathod@gmail.com

Dr. Himani Sharma,
Assistant Professor, Dept of Periodontology,
School of Dental Sciences, Sharda University, Greater Noida, dr.himanisharma05@gmail.com

Dr. Umang Tripathi,
Private practitioner,
Clover dental solutions, Noida, Dr.umangtripathi@gmail.com

ABSTRACT

Background: Dental caries is a major problem in the field of oral and dental health and its prevention is more important than its treatment. Fluoride plays a significant role in prevention of caries, improving oral and dental health. One of the common ways of fluoride use is the use of a fluoride- containing mouthwash, the most important of which in use is 0.2% sodium fluoride mouthwash.

Aim: The aim of the present study was to assess the efficiency of 0.2% sodium fluoride mouthwash in prevention of dental caries according to DMFT index.

Material and Method: The study included a control group and an experimental group. For each group, 10 children were selected randomly. The two groups were assessed by means of intra-oral examination. Data was recorded using DMFT index.

Results: The decrease in DMFT value of the control group and experimental group from baseline to 30 days was statistically significant ($p<0.001$). A statistically insignificant difference between the two groups ($p=0.7022$) was seen.

Conclusion: According to this study results, the daily use of 0.2% sodium fluoride mouthwash has been successful in the improvement of oral and dental health by preventing dental caries among children of school age.

Key words: **Dental caries, Incipient enamel lesions, DMFT index, Varnish, Fluoride mouthwash.**

Introduction

Fluoride has played a pivotal role in dentistry as a cornerstone for preventing dental caries (tooth decay) for several decades. This naturally occurring mineral has demonstrated its effectiveness in strengthening tooth enamel and inhibiting the demineralization process caused by acid-producing bacteria.[1]

Fluoride intake occurs through consumption of drinking water, fluoridated salt, fluoridated products including various drinks, foods, supplements, and powdered milk and the use of fluoridated toothpastes, mouthwashes, and topical fluoride. Foods or drinks prepared using fluoridated drinking water will also contain some fluoride. Since fluorosis can only occur in children under 6 years of age, the use of fluoride should be limited in this group of children. In fact, the use of fluoride mouthwash is not recommended
in children younger than 6 years old with the exception of cases where child is at a high risk for caries.[2]

In a study in South Africa, the use of 0.2% sodium fluoride for a period of 6 years resulted in reduction of dental caries incidence according to DMFT index.[2] Previous studies have demonstrated that socio-economic status of families influence the amount of caries reduction following the use of fluoride: The amount of reduction in DMFT scores is generally higher in groups with low socio-economic status.[3]

The comprehensive use of fluoride, including community-level strategies, professional applications, and daily oral hygiene practices, underscores its significance in the multifaceted approach to caries prevention. However, it is imperative to balance the benefits of fluoride with the potential risks of excessive intake, emphasizing the importance of individualized dental care and professional guidance. The present study was carried to assess the efficiency of 0.2% sodium fluoride mouthwash in prevention of dental caries according to DMFT index.

Materials and Methods

In this study, children from orphanage were taken into consideration. Twenty children were selected randomly by the toss of a coin on the basis of the following inclusion criteria and exclusion Criteria:

INCLUSION CRITERIA

1. Children with DMFT <2.
2. Children having >2 white spot lesions
3. Children without any known systemic illness.
4. Children >6yrs and <14 yrs.
5. Children should be staying in same area or conditions for >2 yrs.

EXCLUSION CRITERIA

1. Children using any other oral hygiene aids other than routine brushing with a dentifrice.
2. Children undergoing orthodontic treatment.
3. Children with history of professionally applied topical Fluoride.

Consent was taken from the orphanage authority for the conduction of study on selected participants and an agreement was made, not to use any other oral hygiene products than those assigned during the study, including mouthrinses, dentifrices, whitening or therapeutic chewing gums or whitening formulations etc. Participants were instructed not to visit any dental surgeon during the study period and no participation in other studies was agreed upon. The 20 participants were divided into 2 different groups with equal number of children in each group: Group A - Control group (Duraphat Fluoride Varnish, Colgate), Group B – Experimental Group (Oradox Kiddy F Mouthwash, Prevest Denpro Ltd, Jammu).

A thin layer of Duraphat was applied on all the teeth of participants in Group A. Group B was instructed to rinse twice daily for 30 seconds with Kiddy F mouthwash (according to the Manufacturer's Guidelines).

To eliminate the confounding effect of some variables on proper assessment of data, the effect of these variables was evaluated and the samples were normalized before performing the main analysis of data, if necessary. The subjects in the study were demonstrated toothbrushing technique (Fonne's technique) and instructed to take same amount of toothpaste (pea size). They were also instructed to brush teeth twice daily for 2 minutes, thus standardizing the duration, technique and time for brushing teeth.

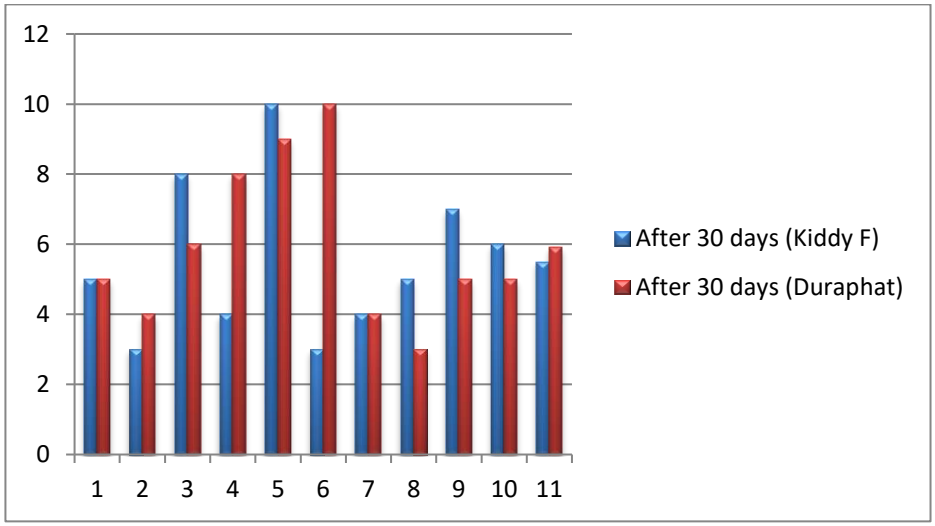
Clinical assessments were performed in the clinic by a single examiner using mouth mirror and probe at the time of initial assessment (Baseline) and after 30 days. The collected data was subjected to statistical analysis using t test. Statistical significance was taken at $p < 0.05$.

Results

After 30 days, the mean DMFT value for the control group was 6.1±2.330. The mean DMFT index for the experimental group was 5.5 ± 2.273. The comparison of experimental and control groups based on DMFT is shown in Table 1 and Graph 1.

Table 1: Mean Values for DMFT

Sno.	Treatment Modalities	At Baseline	After 30 Days
1.	Group A (Duraphat Varnish)	8.9±3.813	5.9±2.330
2.	Group B (Oradox Kiddy F)	9.5 ± 3.027	5.5 ± 2.273
P Value			0.7022



Graph1: Depicts the Intergroup Comparison after 30 days; P = 0.7022

The difference of DMFT index between control and experimental groups was statistically insignificant ($p<0.001$). However, on intra group comparison from baseline to 30 days there was statistically significant difference in control and experimental groups (P= 0.032 and P= 0.006 respectively).

Discussion

Dental caries, commonly known as tooth decay, remains a prevalent global health issue, particularly among children. One widely recognized and extensively studied preventive measure is the use of fluoride, with 0.2% sodium fluoride emerging as a key player in dental care. This article aims to delve into the scientific evidence supporting the efficacy of 0.2% sodium fluoride in reducing dental caries in children, drawing upon relevant studies and research.[4]

The primary mechanism through which sodium fluoride combats dental caries lies in its ability to enhance remineralization and inhibit demineralization of tooth enamel. Fluoride strengthens tooth structure by promoting the incorporation of minerals like fluoride and calcium into the hydroxyapatite crystals, making them more resistant to acid attacks from bacteria in the oral cavity.[5]

In the present study it was found that both Oradox Kiddy F and Duraphat Varnish were equally effective in prevention of dental caries in children. However, there was a significant difference in the DMFT index from baseline to 30 days in both the groups. Additionally, factors such as socioeconomic status, oral hygiene practices, and dietary habits can influence the effectiveness of fluoride interventions thus these confounding factors were considered while conducting the present study. Although fewer number of permanent teeth leads to a lower DMFT value, the obtained results are still valuable since the mean age of case and control subjects in the present study was the same. However,

the difference between studied age groups should be considered when comparing the results of this study with that of the previous studies.

The optimal concentration of fluoride is a crucial factor in achieving the desired preventive effects without causing adverse effects such as dental fluorosis. Numerous studies have explored the effectiveness of 0.2% sodium fluoride in various formulations, including toothpaste, gels, and mouth rinses. Understanding the appropriate dosage and application methods is essential for maximizing benefits while minimizing risks.[6]

A comprehensive review of clinical trials reveals a consistent pattern of reduced dental caries in children exposed to 0.2% sodium fluoride. These trials often span several years, offering valuable longitudinal data on the long-term effects of fluoride application. Notable studies include those conducted by Marinho et al. (2003)[3] and Walsh et al. (2010)[7], providing robust evidence supporting the efficacy of 0.2% sodium fluoride in preventing dental caries. Additionally, ongoing research is necessary to address emerging issues, such as the potential impact of changing lifestyles and dietary patterns.

Conclusion

According to the obtained results, it can be concluded that the daily use of 0.2% sodium fluoride mouthwash in school has been successful in prevention of caries. The careful consideration of dosage, application methods, and community-level interventions contributes to the success of fluoride-based preventive measures. As oral health remains a priority in public health initiatives, continued research and implementation of evidence-based strategies, including the use of 0.2% sodium fluoride, are crucial for promoting optimal dental well-being in children.

References

1. Marinho VC., Higgins JP, Logan S, Sheiham A. Fluoride Varnishes for Preventing Dental Caries in Children and Adolescents. Cochrane Database of Systematic Reviews, 2003(3), CD002279.
2. McDonald RE, Avery DR, George KS. Dental caries in the child and adolescent. In: McDonald RE, Avery DR, Dean JA: Dentistry for the Child and Adolescent, 8th ed. St.Louis: Mosby; 2004:205-32.
3. Asl Aminabadi N, Balaei E, Pouralibaba F. The Effect of 0.2% Sodium Fluoride Mouthwash in Prevention of Dental Caries According to the DMFT Index. J Dent Res Dent Clin Dent Prospects. 2007;1(2):71-6. doi: 10.5681/joddd.2007.012. Epub 2007 Sep 10. PMID: 23277837; PMCID: PMC3525928.
4. Eid SA, Khattab NM, Elheeny AA. Untreated dental caries prevalence and impact on the quality of life among 11 to14-year-old Egyptian schoolchildren: a cross-sectional study. BMC Oral Health. 2020 Dec;20(1):1-1.
5. Buzalaf MAR, Pessan JP, Honório HM, Ten Cate JM. Mechanisms of action of fluoride for caries control. Monogr Oral Sci. 2011;22:97-114. doi: 10.1159/000325151. Epub 2011 Jun 23. PMID: 21701194.

6. Horst JA, Tanzer JM, Milgrom PM. Fluorides and Other Preventive Strategies for Tooth Decay. Dent Clin North Am. 2018 Apr;62(2):207-234. doi: 10.1016/j.cden.2017.11.003. PMID: 29478454; PMCID: PMC5830181.

7. Walsh T, Worthington HV, Glenny AM, Appelbe P, Marinho VC, Shi X. Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents. Cochrane Database Syst Rev. 2010 Jan 20;(1):CD007868. doi: 10.1002/14651858.CD007868.pub2. Update in: Cochrane Database Syst Rev. 2019 Mar 04;3:CD007868. PMID: 20091655.