

## Preferences Of Fluoride Application For Children With Mixed Dentition

Research Article

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### Abstract

**Introduction:** Dental caries are chronic conditions especially among children aged between 2 to 5yrs. The presence of untreated caries can affect the child's esthetics, causing them pain and interfering in the child's day to day activities. The use of fluoride in various methods such as water fluoridation, toothpaste, sealants, mouth rinses, and professional topical agents is considered a measure of great importance for the prevention of dental caries, owing to the anticariogenic property of dental caries.

**Aim:** To analyse the preferences of fluoride application for children with mixed dentition.

**Materials and Methods:** The study was performed as a retrospective study under a university setting in the outpatient department of Pediatric and Preventive Dentistry. Data was collected by reviewing patient records and analysed data of 56000 patients between June 2020 to Feb 2021. Verification of the data was done with the presence of additional reviewers by reviewing photographs of application of fluoride. Collected data was subjected to statistical analysis by chi-square test in SPSS software.

**Results:** Among the 862 children, about 82.49 % of them preferred fluoride gel and 17.51% chose fluoride varnish. Comparison on gender showed fluoride gel was preferred by dentists in treating both male and female children, which was not statistically significant ( $p=0.3$ ).

**Conclusion:** Higher preference of fluoride gel was noticed when compared to fluoride gel when treating children with mixed dentition. There was no preference based on the gender of the children.

**Keywords:** Fluoride Application; Dental Caries; Prevention; Management; Innovative Material.

### Introduction

Dental caries are chronic conditions especially among children aged between 2 to 5yrs. The presence of untreated caries can affect the child's esthetics, causing them pain and interfering in the child's day to day activities. The use of fluoride in various methods such as water fluoridation, toothpaste, sealants, mouth rinses, and professional topical agents is considered a measure of great importance for the prevention of dental caries, owing to the anticariogenic property of dental caries. Fluorides are the key element to successful caries prevention [1]. They are also effective as therapeutic agents in non-restorative caries treatment for the inactivation or arrest of caries lesions [2]. Evidence suggests

that the cariostatic effect of fluoride is mostly exerted by its topical rather than systemic effect. This effect might be even greater when combined with good oral hygiene, such as when practiced as comprehensive tooth brushing with a fluoride toothpaste.

Despite the essential caries prevention by the utilization of fluoridated toothpaste, other topical fluorides also can be utilized in children who are under the upper risk of caries development, including children with special oral health care needs or under treatment and in risk periods like tooth eruption [3]. The evidence for the caries preventive effect of gels, rinses and varnishes is bigger in quality and quantity for permanent than primary teeth. Additionally, the value effectiveness has got to be considered for

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groups with low caries prevalence [4]. This is often also true for the mode of application, e.g., with gels, where in-office application offers greater control, but also higher costs, compared with settings like schools or home application with lower costs, but also possibly reduced compliance [5].

Fluoride varnishes are the most convenient form of professional use of topical fluoride in preschool children, due to their easy application and well tolerated among children [6]. The application time of varnish varies from 1 to 4 minutes [7]. Varnish acts by hardening on contact with saliva and thereby forming a film that sticks to the dental surface. Thus it can remain on the surface of enamel for several hours. Fluoride varnish, an important material to prevent early childhood caries. A fluoride gel, another formulation of fluoride apart from varnish, is also a professional topical administration method, widely used in school going children and young adults [8]. The gel is placed on a foam tray, which the child or young adult has to keep in their mouth and has to bite into for 4 minutes. Cases have been reported where young people unusually accidentally swallow some of the gel, feeling sick-ness, vomiting, and headache and stomach pain. Due to higher risk of toxicity, fluoride gel treatment is generally not recommended to children below 6years of age [9]. Parental knowledge with respect to the first dental visit of their child, the correct time to start cleaning the child's teeth, a quantity of toothpaste used, cariogenic effects of dietary food, the requisite for fluoride treatment etc., needs to be improved. Our team has extensive knowledge and research experience that has translated into high quality publications [10-22, 23-29]. The aim of this study was to analyse the preferences of fluoride application for children with mixed dentition.

**Materials and Methods**

The study was performed as a retrospective study under a university setting in the outpatient department of Pediatric and Preventive Dentistry. Ethical approval was obtained from the institutional committee (ethical approval number: SDC/SIHEC/

DIASDATA/0619-0320). Data required for the study was procured by reviewing patient records and analysed data of 200000 patients between June 2019 to feb 2021. Informed consent was obtained from the parents or guardian regarding usage of the clinical data for research purposes.

Inclusion criteria were patients between the age group of 6-12 years with mixed dentition, who underwent topical fluoride application for preventive management of dental caries. Exclusion criteria include patients below 6 years and above 12 years of age, and those patients who were not treated using topical fluoride.

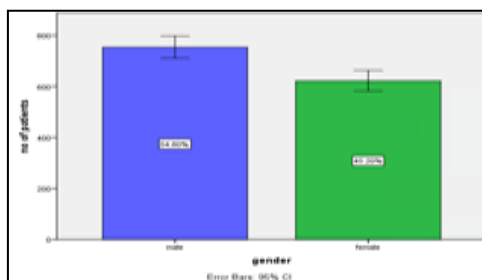
Digital entry of clinical examination, intraoral photographs of the oral cavity and the treatment procedure were assessed. Verification of the data was done with the presence of additional reviewers, procedure notes and photographs of application of fluoride. Stratification and randomisation were done to minimize sampling error. If any error in data entry or patient details or clinical data were noticed, that case sheet was excluded from the study.

The data collected were tabulated in MS Excel and was then analysed in SPSS software version 22 (IBM Corp, Texas, LA). Descriptive statistics were used and comparison between groups were done by using Chi square tests.

**Results**

Among the 4330 case sheet records taken for the study, 54.80% of children were males while 45.20% were females (figure 1). About 82.48 % preferred fluoride gel and 17.51 % preferred fluoride varnish (Figure 2). About 83.94 % of the individuals were treated in the UG clinic and 16.06 % of the individuals were treated in the PG clinic (Figure 3). About 49.97% of male and 41.22% of females had undergone fluoride gel application. Comparison on gender showed fluoride gel was preferred by dentists in treating both male and female children. However this is statistically not significant (p-value > 0.05) (Figure 4).

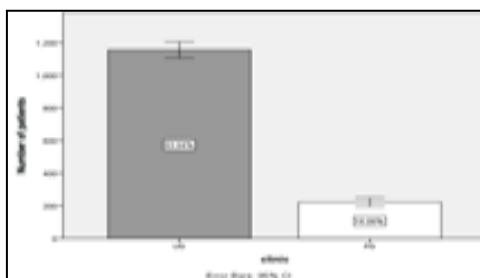
**Figure 1. The bar graph shows the gender distribution of the participants . 54.80% of children were males (blue) while 45.20% were females (green).**



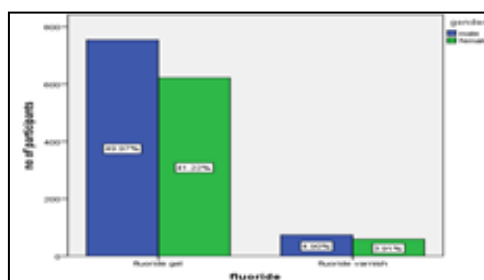
**Figure 2. The bar graph shows the methods of fluoride treatment preferred by dentists for the children in the present study. About 82.49% (pink) preferred fluoride gel and 17.51% (red) preferred fluoride varnish.**



**Figure 3.** The bar graph shows the clinic distribution where fluoride application was done. About 83.94% (grey) of the individuals were treated in the UG clinic and 16.06% (white) of the individuals were treated in the PG clinic.



**Figure 4.** Bar graph depicting the association between the fluoride preference and the gender of the children. The x-axis represents the gender and y-axis represents the no of participants who have undergone fluoride treatment. About 49.97% of male (blue) and 41.22% of female (green) had undergone fluoride gel application and 4.90% of male (blue) and 3.91% of females (green) had undergone fluoride varnish application. However this is statistically not significant with chi-square value - 21.42 and p-value = 0.3 (p-value > 0.05) hence not significant.



## Discussion

The rates of fluoride gel administrations versus fluoride varnish, as observed in this study showed fluoride gel having a greater prevalence rate compared to fluoride varnish. About 82.49 % of the total individuals have been subjected to fluoride gel treatment and about 17.51% of the individuals are subjected to fluoride varnish treatment. The mean age of acceptance to fluoride gel treatment is observed to be around 11yrs. The mean age of acceptance for fluoride varnish in this study was observed to be between 5yrs from the previous study [30]. Since our population age group is a mixed dentition from 6-12 years, there is more prevalence of fluoride gel among the individuals.

About 54.80% of male individuals and 45.20% of female individuals have participated in this fluoride application. Children who were male had a higher prevalence of fluoride treatments. The gender distribution of the study shows a males predilection for the administration of both fluoride gel and fluoride varnish. About 83.94 % of the individuals are treated in the UG clinic and 16.06 % of individuals are treated in the PG clinic. Higher incidence of use of fluoride gel was noticed in Undergraduates clinics while Postgraduates preferred to use fluoride varnish. The preference to treatment from undergraduates vs postgraduates in this study was reported that parents prefer treatment from undergraduates rather than postgraduates for fluoride gel while only postgraduates are allowed to handle fluoride varnish treatment for pediatric patients [31].

Topical application of fluoride gels has been used widely as a measure for the intervention of caries in dental clinics and school-based programs for over three decades. Dental preventive therapy should start early in a child's life. The need for early intervention is to reduce or eliminate oral diseases and the lack of awareness

among children about oral health, mandate the involvement of parents in the prevention process. Studies have reported that low parental knowledge and a poor attitude towards oral health are associated with an experience of high caries in young children. It is a requirement that only if parents have a positive perspective towards dentistry that it will have a good impact on their child's oral health.

Our study is in concordance with previous literature and reports a low incidence of fluoride treatment in pediatric dentistry. These can be attributed to the fact that many parents are not aware of fluoride treatment and refuse; however, on awareness can accept the treatment.

The gender distribution of this study reveals a male predilection towards acceptance of fluoride treatment [32]. This can be attributed to the fact that the study is performed unicentric, hence unequal distribution of a population. No previous literature was observed to have interpreted similar findings. Fluoride gel is clearly greater in prevalence compared to fluoride varnish in our study. It is due to factors such as fluoride gel is prescribed for children above 5yrs up to 17yrs, while fluoride varnish is recommended for preschool going children and hence an unequal distribution of the sample data. Previous studies cite facts in concordance with our findings that gel is widely used compared to fluoride varnishes.

The preference to get treatment from undergraduate or postgraduates by parents as depicted shows that in our study, parents prefer undergraduates treating their children for fluoride gel compared to postgraduates. This can be due to the influence of factors such as the ambience of general clinics, the undergraduate clinician's attitude towards the child and parent and their quality of work. Previous literature, however, cites that in general postgraduates are better in handling pediatric cases [33]. Our study re-

sults are not in concordance with previous literature which point out postgraduates are experts in behavior management of children exclusively. However, under effective training and knowledge on how to handle and manage pediatric patients, undergraduates can also be skilled in treating and managing pediatric patients. Fluoride varnish has been observed to be exclusively treated by only postgraduates.

The statistical analysis performed using the IBM SPSS software analysis to establish or check if there is an existing correlation between the parameters assessed, shows that age negatively correlates with fluoride type [33]. Previous studies have also been performed using the analysis software to establish a significant correlation if any. Fluoride treatment is amiable in controlling caries, thereby leading to a reduced risk assessment and is cost-effective. It is an easy to administer technique hence advised in clinical practice and is imperative to educate the parent and child regarding the same.

The advantages of this study imply that this study was performed with available data and population of variant economic stature. The limitations of the study include that it was performed as a unicentric study, smaller sample size, unequal distribution and geographical trends not assessed. Larger sample size and different ethnicity of the participating patients can yield better results. It is also essential to create awareness of the importance of fluoride with respect to various factors such as control early childhood caries, reduce caries risk in children among parents and the general population.

## Conclusion

Within the limitations of the present study, higher preference of fluoride gel was noticed when compared to fluoride varnish when treating children with mixed dentition. There was no preference based on the gender of the children. Current best practice includes recommending twice-daily use of a fluoridated dentifrice for children in optimally fluoridated and fluoride-deficient communities, coupled with professional application of topical fluoride gel, foam, or varnish.

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