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Assessment of effect of fluoride varnish in preventing dental caries of first permanent molars

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ABSTRACT

Background: Dental caries continues to be too prevalent and severe globally, impacting numerous children. The present study was conducted to assess effect of fluoride varnish in preventing dental caries of first permanent molars.

Materials & Methods: 120 children of both genderswere divided into 2 groups. Group I comprised of 60 in which topical application of fluoride varnish at baseline, and then every 6 months, for a total of 4 applications during the 24-months was performed. In group II children (60), no varnish was applied. The caries status of the primary and erupted permanent teeth was recorded according to World Health Organization (WHO) criteria at baseline and at the end of the 24 months.

Results: Group I comprised of 25 males and 35 females and group II had 23 males and 37 females. Frequency of tooth brushing was >2 in 16 in group I and 18 in group II and <2 in 44 in group I and 42 in group II. Frequency of sweets intake was >1 in 26 in group I and 29 in group II and <1 in 34 in group I and 31 in group II. Dental caries in primary dentition was seen in 52 in group I and 50 in group II. The mean DFS was 0.03 in group I and 0.04 in group II. Dental caries was seen in 7 in group I and 9 in group II. The difference was non- significant (P> 0.05). The mean DFS of the first permanent molars over a 24-months study course in group I was 0.41 and in group II was 0.68. Dental caries was seen in 10 in group I and 15 in group II. The difference was significant (P< 0.05).

Conclusion: The caries increments of first permanent molars can be reduced by applying fluoride varnish twice a year.

Keywords: *Dental caries, first permanent molars, fluoride varnish*

1. INTRODUCTION

In several countries, the occurrence and seriousness of dental caries in both primary and permanent dentitions have diminished over the past four to five decades. Even with this accomplishment, dental caries continues to be too prevalent and severe globally, impacting numerous children. In recent decades, dental caries has emerged as a considerable health challenge.[1,2] Data from the Chinese National Oral Health Survey indicated that between 2005 and 2015, the prevalence of dental caries in the permanent teeth of 12-year-olds rose from 28.9% to 38.5%, while the mean decayed, missing, and filled teeth (DMFT) index increased from 0.54 to 0.86.[3]

The first permanent molars are the teeth that are most prone to caries, with around 20% of them having already decayed prior to reaching the point at which sealants are recommended. The first permanent molar is especially susceptible to dental caries shortly after it erupts in the mouth.[4] The vulnerability is primarily linked to significant plaque accumulation (as the complex fissures are partially covered by gingiva for a considerable period of time), incomplete post-eruptive maturation of the

enamel, and insufficient parental awareness of tooth emergence. It is essential to shield first permanent molars from the moment teeth begin to erupt, as they play a vital role in preventing caries.[5] Sealants for pits and fissures can stop the dental caries of partially erupted molars. Because pit and fissure sealants are technique-sensitive and require advanced dental equipment and skilled operators, their use is limited in remote and rural areas. As per the Cochrane database, fluoride varnish effectively diminishes tooth decay in primary as well as permanent dentitions. Fluoride varnish is regarded as a highly safe dental product.[6]The present study was conducted to assess effect of fluoride varnish in preventing dental caries of first permanent molars.

2. MATERIALS & METHODS

The study was carried out on 120 children of both genders. All parents gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. A thorough clinical examination was carried out. Children were divided into 2 groups. Group I comprised of 60 in which topical application of fluoride varnish at baseline, and then every 6 months, for a total of 4 applications during the 24-months was performed. In group II children (60), no varnish was applied. The caries status of the primary and erupted permanent teeth was recorded according to World Health Organization (WHO) criteria at baseline and at the end of the 24 months.Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

3. RESULTS

Table I Baseline data

Parameters	Variables	Group I	Group II	P value
Gender	Male	25	23	0.91
	Female	35	37	
Frequency of tooth brushing	>2	16	18	0.82
	<2	44	42	
Frequency of sweets intake	>1	26	29	0.57
	<1	34	31	
Dental caries in primary dentition		52	50	
Caries in permanent dentition	Mean DFS	0.03	0.04	0.61
	Prevalence	7	9	0.42

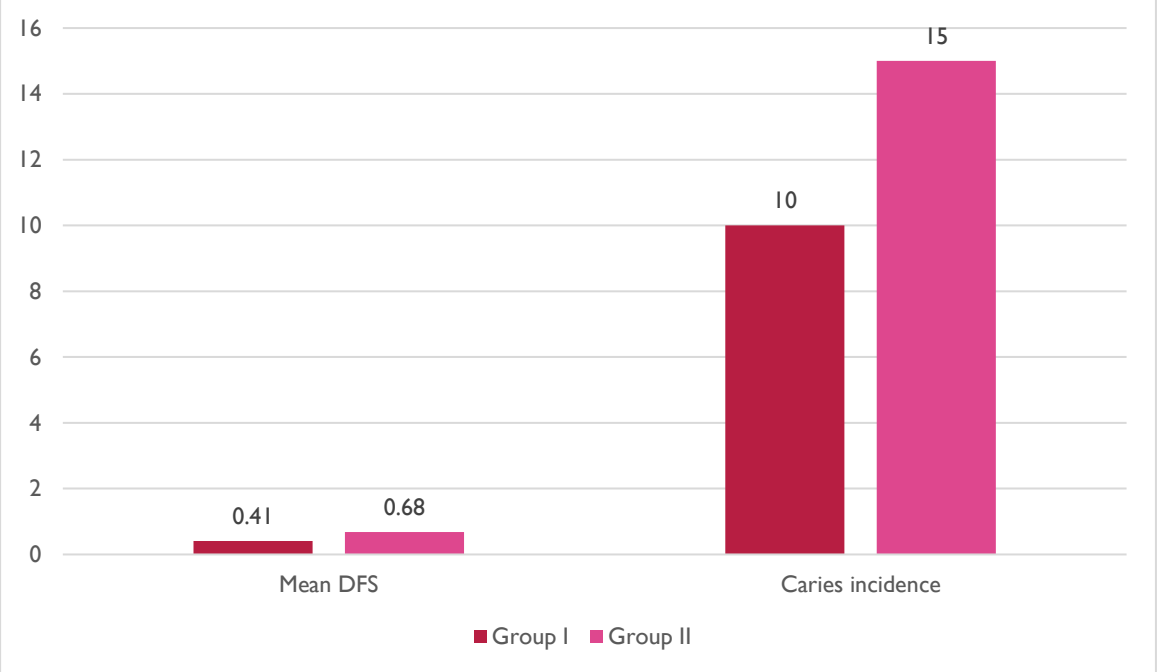
Table I shows that group I comprised of 25 males and 35 females and group II had 23 males and 37 females. Frequency of tooth brushing was >2 in 16 in group I and 18 in group II and <2 in 44 in group I and 42 in group II. Frequency of sweets intake was >1 in 26 in group I and 29 in group II and <1 in 34 in group I and 31 in group II. Dental caries in primary dentition was seen in 52 in group I and 50 in group II. The mean DFS was 0.03 in group I and 0.04 in group II. Dental caries was seen in 7 in group I and 9 in group II. The difference was non- significant (P> 0.05).

Table II Assessment of caries increment of the first permanent molars over a 24-months study course

Parameters	Group I	Group II	P value
Mean DFS	0.41	0.68	0.01
Caries incidence	10	15	0.05

Table II, graph I shows that mean DFS of the first permanent molars over a 24-months study course in group I was 0.41 and in group II was 0.68. Dental caries was seen in 10 in group I and 15 in group II. The difference was significant (P< 0.05).

Graph I Assessment of caries increment of the first permanent molars over a 24-months study course



4. DISCUSSION

Caries is one of the major ailments faced globally due to increased consumption of refined carbohydrates, despite health education measures taken to curb the initiation and progression of caries in both children and adolescents.[7] Its origin is multifactorial and continues to be a burden in spite of major advances in prevention and management techniques. Many preventive measures have been suggested and used in different ways to arrest the progression or prevention of caries.[8] Numerous fluoride compounds with varying concentrations and duration of application have been used over time.[9] The present study was conducted to assess effect of fluoride varnish in preventing dental caries of first permanent molars.

We found that group I comprised of 25 males and 35 females and group II had 23 males and 37 females. Frequency of tooth brushing was >2 in 16 in group I and 18 in group II and <2 in 44 in group I and 42 in group II. Frequency of sweets intake was >1 in 26 in group I and 29 in group II and <1 in 34 in group I and 31 in group II. Dental caries in primary dentition was seen in 52 in group I and 50 in group II. The mean DFS was 0.03 in group I and 0.04 in group II. Dental caries was seen in 7 in group I and 9 in group II. Wang et al[10] in their study, the children in the test group were biannually applied fluoride varnish. The outcomes were measured at an individual level. In total, 107 classes (51 in the test group, 56 in the control group) were recruited for the trial. Of the 5397 participants, 5005 children (2385 in the test group, 2620 in the control group) completed the study. At the 24-month follow-up, the mean decayed and filled surface increment of the first permanent molars of the children in the test group was significantly lower than that of the children in the control group (0.38 versus 0.61). The caries incidence of the first permanent molars in the test group was 17.0%, while that of the control group was 23.7%, with a PF of 28.3%.

We found that the mean DFS of the first permanent molars over a 24-months study course in group I was 0.41 and in group II was 0.68. Dental caries was seen in 10 in group I and 15 in group II. Utomo et al[11] found that meta-analysis of 5 articles showed that the use of fluoride varnish reduced DMFT 1.21 units lower, compared to those not using fluoride varnish in children. The results of the meta-analysis were statistically significant (SMD = -1.21; 95% CI = -3.15 to 0.74; p= 0.220).The use of fluoride varnish may decrease DMFT in children.

Aguropoulus A et al[12]evaluated the effect of biannual fluoride varnish applications in preschool children as an adjunct to school-based oral health promotion and supervised tooth brushing with 1000ppm fluoride toothpaste.424 preschool children, 2-5 year of age, from 10 different pre- schools in Athens were invited to this double-blind randomized controlled trial and 328 children completed the 2-year programme. All children received oral health education with hygiene instructions twice yearly and attended supervised tooth brushing once daily. The test group was treated with fluoride varnish (0.9% diflurosilane) biannually while the control group had placebo applications. The primary endpoints were caries prevalence and increment; secondary outcomes were gingival health, mutans streptococci growth and salivary buffer capacity.The groups were balanced at baseline and no significant differences in caries prevalence or increment were displayed between

the groups after 1 and 2 years, respectively. There was a reduced number of new pre-cavitated enamel lesions during the second year of the study (p=0.05) but the decrease was not statistically significant. The secondary endpoints were unaffected by the varnish treatments.

The shortcoming of the study is small sample size.

5. CONCLUSION

Authors found that the caries increments of first permanent molars can be reduced by applying fluoride varnish twice a year.

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