Original Article

International Journal of Dental and Health Sciences
Volume 04,Issue 05

THE EFFECT OF FLUORIDE AS PREVENTIVE OF DENTAL CARIES

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ABSTRACT:

The aim of this study is to evaluate the effect of the local preventive method of application of fluoride gel in dental caries in permanent dentition.

Materials and method .We studied 498 children from 6-10 years old. The control group had 254 children and the fluoride treated group had 244 children. For this study we used the material of fluoride gel "Durashield" 5% Sodium Fluoride (22.600 p.p.m).

Results. Amplitude of deviations for the control group is up to 66, while for the fluoride group goes up to 9. From the age of 6 to the age of 10 the children have manifested 35% problems with caries, extraction and filling, while in 18 months are only 3 children who had their teeth extracted. If we were to follow the initial rhythm of the caries damage or extractions this value would go up to 13.12% because referring to 8.75% decayed teeth in one year, in 18 months the value of decayed teeth is 13.12%.

Conclusions . The fluoride gel 5% NaF resulted very effective in the caries prevention in permanent dentition in the treated group compared to the control group.

Keywords: caries, children, fluoride, permanent dentition

INTRODUCTION:

Dental caries is the most wide spread disease and with the higher influence in the oral health in all the world population.[1] Today caries is defined as an infectious disease, bacterial and transmittable, multi factorial that is accompanied with the destruction of the teeth structure.[2],[3] Also, caries is the main cause of pain and earlier extraction of the teeth in the oral cavity.[4] There is a decrease in the prevalence of the dental caries in the permanent teeth in the developed countries, and researchers think that the main cause is the raise of the preventive measurements and fluoride exposure.[5] The use of fluoride in different forms and methods has had a significant effect in the reduction of the dental caries. Fluoridation may be systemic or general, topical or local. The systemic fluoridation consists of administration of the fluoride products in general ways like food, water, and additives in tablets or solutions.[6] This type of fluoride has endogenous action and is deposited in the teeth structure by forming the enamel and dentine.[6] also, the systemic fluoride has a slight local effect as a part of it is excreted from the salivary glands. The professional application of the fluoride in the topical method is done with the products that contain high doses of fluoride gel, spray, foam, etc.. It is this kind of exposure to this professional or non professional

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products that has had an impact in the progress of dental caries in the developed countries, and especially in the risked group ages.[7] This pathology is more aggressive in the childhood ages and with the time passing there is a slowing of the process.[8] The ions of the fluoride other than the action on the process of demineralization and mineralization, also act on the physiology of the microbial cells and especially the mutant streptococcus. [9] Nowadays, a small number of studies show the inhabiting effect of locally given fluoride in demineralization and enhancing the mineralization in deep lesions. [10]

Aim : is to evaluate the effect of the local preventive method of application of fluoride gel in dental caries in permanent dentition.

MATERIALS AND METHODS:

Study design: This is a prospective study, with a controlled sample for a period of 18 months.

Population study : We studied 498 children from 6-10 years old. We separated them into two groups. The control group had 254 children and the fluoride treated group had 244 children. For this study we used the material of fluoride gel "Durashield" 5% Sodium Fluoride (22.600 p.p.m). This material has more advantages compared to other materials that contain fluoride as it is easily applicable, fast and does not need prophylactic cleaning with the brush and paste before application.

Statistical analyses

The data were analyses using the ANOVA testing. The values of $p< 0.05$ were considered significant.

RESULTS:

Extracted teeth, filled and the teeth with caries are divided into two subgroups as follows:

n_1= filled teeth, n_2= extracted teeth, n_3= decayed teeth, n_4=healthy teeth, n_{13}= filled teeth + decayed teeth, n_{14}= filled teeth + healthy teeth,n_{12} = filled teeth + extracted teeth, n_{23}= decayed teeth +extracted teeth, n_{24}= extracted teeth + healthy teeth, n_{34}= decayed teeth + healthy teeth, n_{123}= filled teeth + extracted teeth + decayed teeth, n_{124}= filled teeth + extracted teeth + healthy teeth, n_{234}= extracted teeth + decayed teeth + healthy teeth.

In the control group for the untreated children, the lack of the treatment has led to significant deviations of the health condition of the children. In the contrast from the group of the fluoridation, where there are insignificant deviations from the initial condition, means that the treatment with fluoride has ensured a normal progress of this health condition. The amplitude of deviations in the control group is up to 66, while in the group of fluoridation goes up to 9. From the age group 6-10 years old, in a period of four years there are 35% manifestation of caries problems, extractions and fillings, while in 18 months time only three children had

extractions. The improvement of the filled teeth and decayed teeth is with 12 children, calculating the extractions 3/244 or 1.2% injuries of the treated children, considering this a very low number. If we would follow the initial rhythm of the caries injuries or extractions, this value would be up to13.12% referring 35/4 or 8.75% decayed teeth in one year, in 18 months time the value of the decayed teeth is 13.12%. The difference of 11 times or 13.12/1.2 shows the high role of the fluoride treatment.

After 18 months the children in the control group have not been treated, and we see that the number of children with caries, extractions and filings is increased, but since the number of children has not changed in these subgroups, the number of teeth with complications is increased by reducing the subgroup of children with healthy teeth. We notice that the subgroup with compound situations are increased too such as n_1n_2, n_1n_3, n_1n_4, n_2n_3, $n_2n_3n_4$.

In the initial moment we see that the subgroup of the healthy children dominates, but among 244 kids there are children with caries, extractions and fillings. The subgroups of the children with mix situations are small, but the method of fluoride treatment followed the recommended protocol from other researchers such as Armstrong WD et al., the children were treated in the initial moment and after 18 months. After 18 months we notice a difference in the increasing of the number of children with healthy teeth, and reduction of children with decayed teeth, and reduction of children with extractions.

DISCUSSION:

The use of local fluoride in the professional method in the prevention of dental caries is one of the methods more frequent and more effective used today in private of public dental service. [11] Professional fluoridation is more effective in caries prevention of the smooth surface than the occlusal caries.[12],[19-20] Local application of fluoride is an absolute indication for the patients who are part of the risky groups for caries.[13] In this group are included individuals with the carious experience the last 12 months or have active caries, insufficient exposure to fluoride, insufficient care from the dentist and low socio economic level. Also the individuals who have endodontic apparatus are part of this group. [14],[15] The data shows that application of fluoride in a professional method has anti caries effect for a two year period. [16],[17] When we compare the results of our study in the group of control and the treated group we notice a prohibition effect of the fluoride gel of the caries pathology in the treated group. A part of dental caries diagnosed at the beginning of the study was of an initial phase, and the fluoride treatment has caused the teeth to return to their previous healthy state. Weintraub and Ramos-Gomez in their study on temporary dentition conclude that there is a prevention fraction of caries pathology of 53% when the fluoride gel

is applied in 93% when there are three or four gel treatments for a two year period. Our study serves as scientific evidence added to the contemporary literature that supports the preventive action of this preparation.

CONCLUSION:

The fluoride gel 5% NaF resulted very effective in the caries prevention in permanent dentition in the treated group compared to the control group. Applying this material 3-4 times a year would help in the prevention of dental caries in all groups of population regardless of caries risk. This material prevents the dental caries in permanent teeth and may slow the caries progress when it has reached the dentine.

Acknowledgment

To perform and report this study was received no financial support from any companies or from a national or international funding source.

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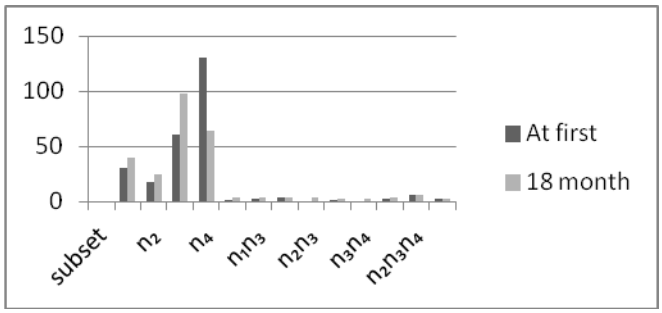
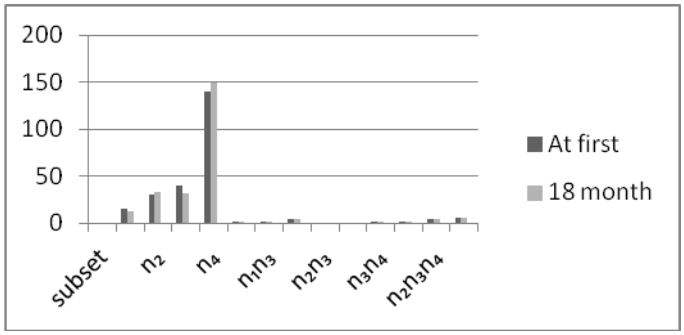
TABLES AND GRAPHS:



Graphic 1: The situation in the control group initially and after 18 months



Graphic 2: Situation in the fluoridation group initially and after 18 months

Fluoride treated group	At first	After 18 months	Deviations
n_1	15	12	-3
n_2	30	33	3
n_3	40	31	-9
n_4	140	149	9
n_{12}	2	2	0
n_{13}	2	2	0
n_{14}	4	4	0
n_{23}	0	0	0
n_{24}	0	0	0
n_{34}	1	1	0
n_{123}	1	1	0
n_{124}	4	4	0
n_{234}	5	5	0

Table 1: The situation in the group of fluoridation at first and after 18 months Σ=244.

Fluoride group	Σ	Min	Max	Media	SD	α	Confidence
At first	244	0	140	18.76	54.82	0.05	6.87
After 18 months	244	0	149	18.76	40.70	0.05	5.10

Table 2: The presentation of SD and confidence in the fluoride treated group

Control group	At first	after 18 months	Deviations
n_1	30	40	10
n_2	17	25	8
n_3	60	98	38
n_4	130	64	-66
n_{12}	1	3	2
n_{13}	2	3	1
n_{14}	3	3	0
n_{23}	0	3	3
n_{24}	1	2	1
n_{34}	0	2	2
n_{123}	2	3	1
n_{124}	6	6	0
n_{234}	2	2	0

Table 3: The situation in the control group at first and after 18 months Σ=254

Control group	Σ	Min	Max	Media	SD	α	Confidence
At first	254	0	130	19.53	50.89	0.05	6.25
After 18 months	254	2	98	19.53	36.58	0.05	4.49

Table 4: The presentation of SD and confidence in the control group

At first			After 18 months		
t values	df	p	*t* value	df	p
.795	698	.427	2.525	661	.012

Table 5: The comparison between the control group and fluoride group at the beginning of the study and after 18 months