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Original Article

Severity of Dental fluorosis among school chidren- A clinical study

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ABSTRACT

Background: Dental fluorosis is commonly seen in children after dental caries**.** The severity of dental fluorosis depends on the fluoride intake during tooth formation. The clinical enamel defects vary from fine white lines to severe chalky or opaque enamel, which may get discolored and are easily broken down after eruption. The present study was conducted to determine dental fluorosis among school children.

Materials & Methods: The present study was conducted 624 school children. In all children, oral examination was done carefully with explorer a plane mirror and tongue depressor following Dean's fluorosis index as 0- normal, 1- questionable, 2- very mild, 3- mild, 4- moderate, and 5- severe.

Results: Out of 624 subjects, boys were 322 and girls were 302. The difference was non- significant (P- 1). Age group 6-9 years had 104 boys and 112 girls, 9-12 years had 162 boys and 142 girls and 12-15 years had 56 boys and 48 girls. The difference was significant (P- 0.01). The grading was questionable in 24 boys, 35 girls, very mild in 86 boys and 75 girls, mild in 114 boys and 102 girls, moderate in 92 boys and 88 girls and severe in 6 boys and 2 girls. The difference was significant (P< 0.05).

Conclusion: It is seen in children in developing teeth. Boys had slightly more fluorosis as compared to girls. Excessive fluoride intake in the form of water, food, salt, sugar etc. may lead to fluorosis.

Introduction

Aberrations Dental fluorosis is a hypo mineralization of enamel and dentine produced by chronic or excessive ingestion of fluoride during tooth development process. Fluoride plays an important role in preventive dentistry due to its superior cariostatic potential. However, superfluous intake of fluoride can lead to dental and skeletal fluorosis.[1]

The main sources which could be responsible for increased fluoride consumption are fluoride containing drinking water and supplements such as tablets, gums, gel, and toothpastes. The suggested safety dosage of fluoride in drinking water is 1 ppm whereas, the daily safety level of fluoride intake is 0.05-0.07 ppm mg F/kg.[2]

The severity of dental fluorosis depends on the fluoride intake during tooth formation. The clinical enamel defects vary from fine white lines to severe chalky or opaque enamel, which may get discolored and are easily broken down after eruption. The enamel discoloration is often so unsightly that it causes psychological problems in patients whereas the loss of enamel is easily affected with dental caries. These may have a negative impact on personal wellbeing.[3]

It has been suggested earlier that the most critical time for the initiation of fluorosis is the "postsecretory or early maturation phase of tooth development." The

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intake of excessive fluoride during different stages of tooth development can have diverse effect on teeth which includes the appearance of white lines or stains on enamel, yellow or brown stains on enamel, and overall involvement of enamel with chalky white or dark colored stains.[4]

It is generally believed that the hypomineralized of affected enamel are mainly due to in-situ toxic effects of the fluoride on the ameloblasts in the enamel formation. Dental fluorosis is a result of alteration in the mineralisation that takes place when fluroide interacts with mineralising tissues. The most common method of diagnosis of dental fluorosis is by Dean's fluorosis index. The stages of index are questionable, very mild, mild, moderate and severe.[5] The present study was conducted to determine dental fluorosis among school children.

Materials & Methods

The present study was conducted in the department of Pedodontics. It included 624 school children of both gender. Parents were informed regarding the study and informed written consent was obtained. Ethical clearance was taken from institutional ethical committee.

General information such as name, age, gender etc, was recorded. Oral examination was done carefully with explorer a plane mirror and tongue depressor following Dean's fluorosis index as 0- normal, 1- questionable, 2- very mild, 3- mild, 4- moderate, and 5- severe. Results were tabulated and subjected to statistical analysis using chi- square test. P value less than 0.05 was considered significant.

Results

Table I Distribution of subjects

Total- 624		
Boys	Girls	P value
322	302	1

Table I shows that out of 624 subjects, boys were 322 and girls were 302. The difference was non-significant (P- 1).

Table II Age wise distribution

Age group (years)	Boys	Girls	P value
6-9	104	112	0.01
9-12	162	142	
12-15	56	48	

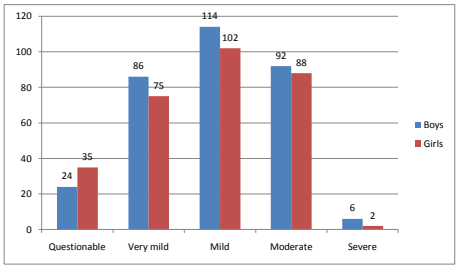
Table II shows that age group 6-9 years had 104 boys and 112 girls, 9-12 years had 162 boys and 142 girls and 12-15 years had 56 boys and 48 girls. The difference was significant (P- 0.01).

Graph I Distribution of children based on grades of Dean's fluorosis index

Graph I shows that grading was found as questionable in 24 boys, 35 girls, very mild in 86 boys and 75 girls, mild in 114 boys and 102 girls, moderate in 92 boys and 88 girls and severe in 6 boys and 2 girls. The difference was significant (P< 0.05).

Discussion

The period when teeth are at highest risk of developing fluorosis is between when the child is born up to 6 years old, though there has been some research which proposes that the most crucial course is during the first 2 years of the child's life. From roughly 7 years old thereafter, most children's permanent teeth would have undergone complete development and therefore their susceptibility to fluorosis is greatly reduced, or even



Graph I Distribution of children based on grades of Dean's fluorosis index

insignificant, despite the amount of intake of fluoride. The severity of dental fluorosis depends on the amount of fluoride exposure, the age of the child, individual response, weight, degree of physical activity, nutrition, and bone growth. Individual susceptibility to fluorosis is also influenced by genetic factors.[6]

Higher levels of severity of the disease promoted a higher social and psychological discomfort. The clinical characteristics of fluorosis lead to shy, sad, and quiet children who cover their faces with their hands to express happiness, smile with closed lips, do not participate in school social activities, and avoid talking with their classmates and smiling due to the shame of their dental appearance.[7] The present study was conducted to determine dental fluorosis among school children.

In this study, out of 624 subjects, boys were 322 and girls were 302. We observed that maximum children had fluorosis in age group 9-12 years (162 boys and 142 girls) followed by 6-9 years (104 boys and 112 girls) and 12-15 years (56 boys and 48 girls). This is similar to Messer et al.[8]

We found that grading was questionable in 24 boys, 35 girls, very mild in 86 boys and 75 girls, mild in 114 boys and 102 girls, moderate in 92 boys and 88 girls and severe in 6 boys and 2 girls. Similar results were seen in study of Beltran et al.[9]

The possible risk factors associated with dental fluorosis include living in regions with water supply fluoridation even at ideal concentrations, the use of fluoride supplements, fluoride levels in toothpaste,

early age of toothpaste use for hygiene, a high frequency of oral hygiene with toothpaste and ingestion of toothpaste, early weaning, and a long period of consumption of infant formula. Other well-known sources of fluoride may contribute to overexposure including bottled waters which are not tested for their fluoride content, inappropriate use of fluoride supplements, ingestion of foods especially imported from other countries.[10]

Dental fluorosis cannot be attributed only to public water supply fluoridation; however, there may be a relation with fluoride levels in some cities where levels are higher than the recommended parameters when associated with other sources of fluoride intake.

Dean's fluorosis index was first published in 1934 by H. Trendley Dean. The grading is as follows, questionable, very mild, mild, moderate and severe. In questionable, the enamel discloses slight aberrations from the translucency of normal enamel, ranging from a few white flecks to occasional white spots. In mild, the white opaque areas in the enamel of the teeth are more extensive but do involve as much as 50% of the tooth. In moderate, all enamel surfaces of the teeth are affected and surfaces subject to attrition show wear. Brown stain is frequently a disfiguring feature and in severe, all enamel surfaces are affected and hypoplasia is so marked that the general form of the tooth may be affected. Pitting, brown stains are widespread and teeth often present a corroded-like appearance.[11]

Conclusion

Excessive fluoride intake in the form of water, food, salt, sugar etc. may lead to fluorosis. It is seen in children in developing teeth. Boys had slightly more fluorosis as compared to girls.

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