Dental fluorosis, exposure, prevention and management in Tripuranthakam Mandal, Prakasam district

Dr. Suneetha Chatla[1], *Dr.Pandu.Brahmaji Rao*[2],

Department of Environmental sciences, Acharya Nagarjuna university

Guntur, Andhra Pradesh, India.

Abstract

The study was carried by Tripuranthakam Mandal, Prakasam district. Dental fluorosis is a known adverse effect of fluoride overuse. Enamel or dental fluorosis is a condition caused by 'excessive' intake of fluoride over an extended period of time. The most common symptom of dental fluorosis is a chalk-like discoloration of teeth with white spots or lines on tooth enamel. In more severe cases the affected areas have a yellow or brown discoloration. In extreme forms, fluorosis may result in a pitted tooth surface. Fluorosis has been reported way back in 1901. The treatment options for fluorosis are varied depending upon individual cases. The purpose of this article is to report various treatment options available for dental fluorosis; it also dwells on the need for the dentists to be aware of their local indigenous pathologies to treat it in a better manner.
Keywords: Dental Fluorosis, Teeth, Tripuranthakam mandal, Dean's index

Introduction :

Dental fluorosis is defined as the disturbance in development of dental enamel; This is caused by excessive amount of fluoride exposure during development, which results in enamel with lower mineral content and increased porosity. The fluoride ion comes from the element fluorine. Fluorine, the 17th most abundant element in the earth's crust, is a gas and never occurs in a free state in nature. It exists only in combination with other elements as fluoride compounds, which are constituents of minerals in rocks and soil. Fluoride exists in both ionic and bound forms in plasma, with the bound form being present in larger quantity. Fluoride concentrations in human saliva are slightly less than those found in Plasma, ranging from 0.01 to 0.05 ppm. Severity of dental fluorosis depends on when and for how long the overexposure to fluoride occurs, the individual response, weight, degree of physical activity, nutritional factors and bone growth, suggesting that dose of fluoride may lead to different levels of dental fluorosis. Esthetic changes in per- moment dentition are greatest concern in dental fluorosis, which are more prone to occur in children who are ex- cessively exposed to systemic and topical fluoride between 20 to 30 months of age. Safe level for daily fluoride intake is 0.05 - 0.07 mg F/kg/day. It has been observed from different researches that tea, pan, tobacco and fluorinated toothpastes also play some role in cause of dental fluorosis. Hence the present work has been out to find out the effect of fluoride rich water and dentifrices on prevalence of fluorosis in district prakasam, and Mandal Tripuranthakam **J.a alvarez, k.mayra,(2009),C.R.M.D.Rodrigues,(2002),B.A.Burt(1992),k.f.Fung(1999),J.Cao,s.f,Luo(1999).** Dental (enamel) fluorosis (DF) is an undesirable developmental defect of tooth enamel attributed to greater than optimal systemic fluoride (F) exposure during critical periods of amelogenesis. DF is characterized by increased porosity (subsurface hypo mineralization) with a loss of enamel translucency and increased opacity **[Fejerskov et al.,**

1990]. It is generally accepted that increasing DF severity correlates with increasing F exposure. However, individual variation in DF severity can exist when Fluoride exposure is relatively constant in a community [**Mabelya et al., 1994); Yoder et al., 1998**]. Our studies using inbred strains of mice indicate that genetic background plays a role in DF susceptibility and in F actions on bone biology **[Everett et al., 2002; Vieira et al., 2005; Mousny et al., 2006;]**. The mechanism(s) that underlie the development of DF remain elusive, as well as the precise stage of amelogenesis most affected by Fluoride. Despite the ability of F to interact at a physicochemical manner with tooth enamel, the cellular target is the ameloblast **[Pergolizzi et al., 1995]**. In chronic Fluoride exposure, the maturation phase of enamel formation appears to be the target stage **[Den Besten, 1986; Richards et al., 1986; Den Besten and Thariani, 1992**]. Retention of enamel matrix proteins due to reduced removal during enamel maturation, perturbation of extracellular transport or initiation of endoplasmic reticulum stress response pathway indicate that some developmental process is possibly adversely affected by excessive Fluoride **[Den Besten, 1986; Den Besten and Thariani, 1992; Matsuo et al., 1996; Den Besten et al., 2002; Kubota et al., 2005].**

Materials and methods:

The present study were conducted between December and January in both 2017-18. We compared the results for dental fluorosis and urinary fluoride before and after the drinking water sources changed during year 2017-18. The Presented study was conducted in the year 2018 in the district of Prakasam, Andhra Pradesh state in India. Prakasam district, one among the 13 district of Andhra Pradesh state.it is extended over an area of 17,626 kilometers and has population of 3,392,764(census,2011).The Prakasam district is bounded in the eastern by the Bay of Bengal, on the south by kadapa and Nellore district , on the west by Kurnool and on the north west by Mahabubnagar district of Telangana. Prakasam district is divided into 56 mandals, which comprise the villages and hamlets.

From the identified district of prakasam, out of 56 mandalas in Prakasam district Tripuranthakam mandal were selected purposively based on the reports of the rural water supply and sanitation department Prakasam. In Tripuranthakam mandal we selected, the 9 villages, namesas;Mittapalem,Ramsamudram,kankanalapalli,Sugalithanda,K.Annasamudram,D.v.n.colony,Gollapalli,Duvvali and p.mudivemula.

Classification of the dental fluorosis severity degrees according to **DEAN's** fluorosis

Index:

Questionable. The enamel represents the usual translucent semivitriform (glass-like) type of structure. The surface is smooth, glossy and usually of pale creamy white color

Very Mild. Small, opaque, paper white areas scattered irregularly over the tooth but not involving as much as approximately 25% of the tooth surface. Frequently included in this classification are teeth showing no more than about 1 – 2mm of white opacity at the tip of the summit of the cusps, of the bicuspids or second molars.

Mild. The white opaque areas in the enamel of the teeth are more extensive but do involve as much as 50% of the tooth.

Moderate. All enamel surfaces of the teeth are affected and surfaces subject to attrition show wear. Brown stain is frequently a disfiguring feature

Severe. All enamel surfaces are affected and hyperplasia is so marked that the general form of the tooth may be affected. The major diagnostic sign of this classification is discrete or confluent pitting. Brown stains are widespread and teeth often present a corroded-like appearance.

Dean's fluorosis index was first published in 1934 by H. Trendily Dean. The index underwent two changes, appearing in its final form in 1942. An individual's fluorosis score is based on the most severe form of fluorosis found on two or more teeth.

QUESTIONARY

Keeping in view of the scope and objectives of the study, interview schedule was prepared. A structurally well prepared and pre tested questionnaire was developed after perusal of the available literature. Thus, the final interview schedule consists of all the relevant items such as profile characteristics, etc., for measuring the variables included in the study. After pre-testing the questionnaire at the proposed study area, necessary modifications were incorporated. The finagled questionnaire which was used in the interview schedule for obtaining the primary data is appended herewith. Name, Age ,Sex, Habituate ,Education ,No.of family Members, Occupation, Sources of drinking water, amount of water consumed, type of toothpaste, Residence how many times brushing per day, have you ever considered teeth whitening, how often do you make dental visit, consumption of tea and sea fish per day etc.

Severity of the dental fluorosis was assessed by deans index with the help of dentist and total samples are tested and classified according to the severity of dental fluorosis. The classification was divided questionable, very mild, mild, and moderate and sever. the study involves collection of both primary and secondary data. the primary data was collected from the selected victims of dental fluorisis with the help of duly pre-tested questionnaire. The secondary data was regard to reports of the rural water supply and sanitation department Prakasam in the study area

Results:

Tripuranthakam and mandal of Prakasam district, Andhra Pradesh India seems to be threaten area of fluoride in dental fluorosis total 45 fluoride effected villages has been find out with the help of rural water supply and sanitation department Prakasam and water samples had been taken for the analysis of water fluoride content. Water samples from different bore wells of 45 villages which showed a high range of 1.8 to 3.4 ppm by DEAN's method. Among 45 villages 45 are showing high levels of fluoride Almost all the selected villages are higher than the permissible level of 1 ppm according to WHO (World health organization 1984). The mild type is (15%),and sever type is higher (30%), Questionable type is (20%), Very mild is lower (10%),Moderate is(25%)Particularly Mittapalem(3.4ppm),in Tripuranthakam mandal has excess levels of fluoride in Drinking water.

We find mean standard deviation of the total children of the sample and the mean value is and the standard deviation is the data was presented in percentage to understand the nature of the level of knowledge about the diseases of dental fluorosis.

Table:1 Systematic representation of the sample

S.NO	NAME OF THE VILLAGE	BOYS	GIRLS
1.	Mittapalem	17	11
2.	RAMSAMUDRAM	23	22
3.	KANKANALAPALLI	25	18
4.	SUGALITHANDA	33	26
5.	K.ANNASAMUDRAM	19	16
6.	D.V.N COLONY	22	22
7.	GOLLAPALLI	23	20
8	DUVVALI	17	16
9	P.MUDIVEMULA	15	14
TOTAL		194	165

Detailed information and classification of the samples according to boys and girls are represented in the table1. The total number of the villages are 9, number of the boys are 194 are (55%) and girls are 165 (45%).

Name	Questionable		Very mild		mild		Moderate		Severe	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Mittapalem	4	2	0	1	2	1	5	3	6	4
Ramsamudrum	3	3	1	0	2	3	7	8	10	8
Kankanalapalli	3	4	1	0	2	2	9	6	10	6
Sugalithanda	10	8	2	2	4	2	9	6	8	8
K.Annasamudram	3	3	3	1	2	3	7	4	4	5
D.v.n colony	6	4	2	1	0	3	6	7	8	7
Gollapalli	4	4	1	2	4	3	6	5	8	6
Duvvali	2	2	0	2	2	1	7	7	6	4
P.Mudivemula	3	1	1	0	1	1	6	6	4	6

Table:2

The responds of every village of the region are classified according to deans index and gender represented in the table: 2. The above table represents about effected children in the region of Tripuranthakam Mandal. Total 9 villages childrens were observed according to deans index.

Table: 3.Classification of effected children in the age

TYPE	7-9 Years		10-12 years		13-15 YEARS		TOTAL	PERCENTAGE
	Boys	Girls	Boys	Girls	Boys	Girls		
QUESTIONABLE	15	11	10	10	13	10	69	20%
VERY MILD	3	4	5	3	3	2	20	10%
MILD	8	9	5	5	6	5	38	15%
MODERATE	22	18	30	20	10	14	114	25%
SEVER	24	24	20	10	20	20	118	30%
TOTAL	72	66	70	48	52	51		

The information represented based on the age view and it is tabulated as above table: 3. Based on the age it was divided into two types. Those are 7-9, 10-12 years and 13-15 yrs. Boys and girls data are represented separately. The percentage was calculated and recorded in the table. The severe type dental fiuorosis is higher which has 30%.and Questionable type of dental fiuorosis is 20%.The very mild 10%, mild 15%, and moderate 25% are as follows.

Accurate of enamel fluorosis

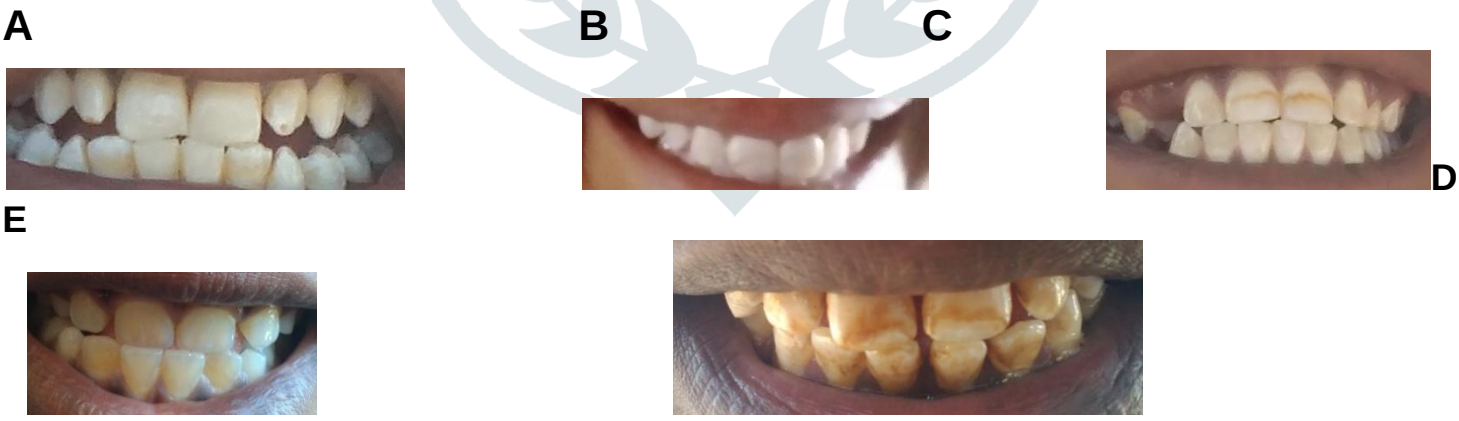
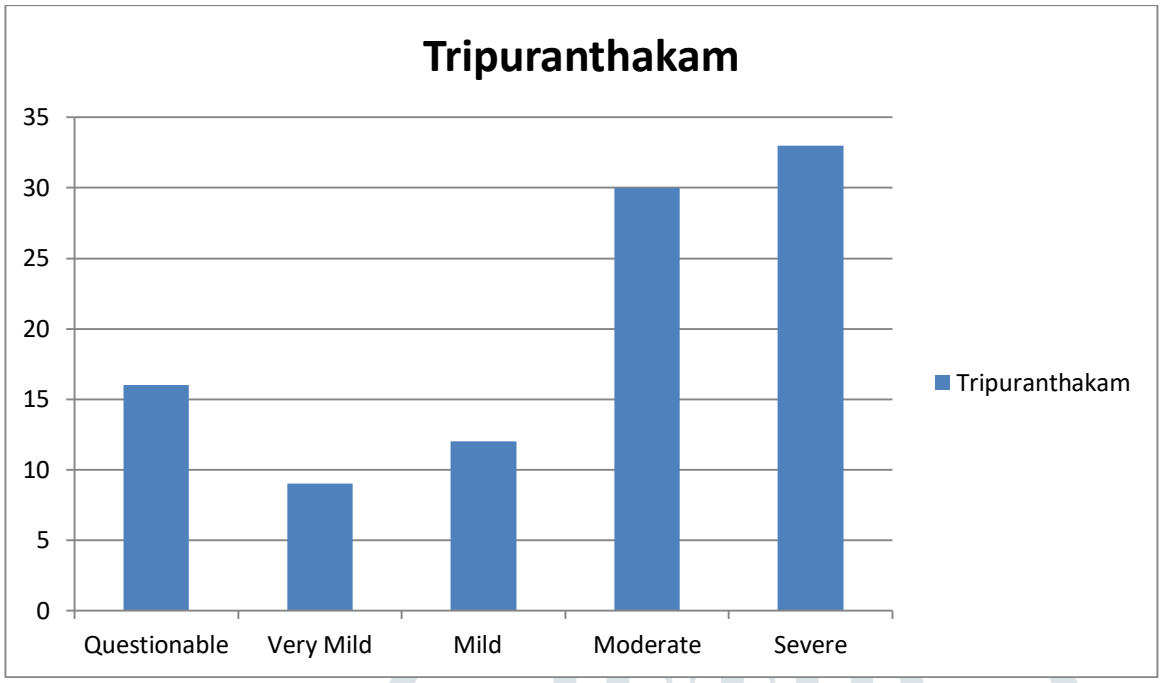


Fig.1: dental fluorosis (Deans grading) (A)Questionable (Grade1), (B)Very mild(grade2), (C)Mild(Grade3), (D) Moderate (Grade 4), (E)Sever(Grade 5).

Figure1: Graphical representation of effected Children of Dental Fluorosis in Tripuranthakam Mandal



Conclusion:

Even though the prevalence of dental fluorosis is high, most of them are unaware of fluorosis stains on their teeth. This study suggests that dental fluorosis is a major public health problem in Tripuranthakam Mandal and is related to the high fluoride content of drinking water. Strategies must develop to reduce the fluoride levels in supplying drinking water to reduce the morbidity of dental fluorosis.

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