FLUORIDE IMPORTANCE IN CONTROLLING CARIES AND FLUOROSIS

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Abstracts
The use of fluorides for oral health has always involved a balance between the protective benefit against dental caries and the risk of developing fluorosis. The link between fluoride and dental health was established to determining the causes of dental fluorosis or enamel mottling. Fluorosis in Indian children was highly prevalent in the early 1990s. Policy were introduced to control fluoride exposure and to reduce the prevalence of fluorosis. The study aimed of describing the prevalence, severity and risk factors for fluorosis, and to describe the trend of fluorosis among Indian children. The study also aimed of exploring the effect of the change in fluoride exposure on dental fluorosis and caries. Establishing an appropriate use of fluoride toothpaste could be successful in reducing fluorosis without a significant increase in caries experience.

Keywords: Fluoride, Fluorosis, dental caries, DMFT, DMFS

1. Introduction:

The use of fluorides for oral health has always involved a balance between the protective benefit against dental caries and the risk of developing fluorosis. The link between fluoride and dental health was established to determining the causes of dental fluorosis or enamel mottling. However, it was the benefit of the exposure to fluoride from between 0.7 to 1.2 ppm in public water supplies for the prevention of dental caries that soon became the dominant public health policy[1]. Dean (1935) recognized that there was a level of exposure to fluoride that was associated with near maximal reduction in caries experience with minimal risk of fluorosis. Establishing that level of exposure has always been a primary goal of population oral health research[2].In the population, dental fluorosis alerts both members of the public and public health authorities to potential over-exposure to sources of fluoride. With the onset of fluoridation in the 1960s and 1970s the improvement in dental health that followed fluoridation blunted attention or interest in the low prevalence of fluorosis. However, as the prevalence of fluorosis increased during the 1980s, research began to focus on fluorosis again[3].The prevalence was 40.2% in fluoridated and 33.0% in non-fluoridated areas among 12 year olds and 48% among 7 year olds in a fluoridated area[4]. Puzio, Spencer and Brennan (1993) investigating fluorosis in South Australian children in 1993 reported that the prevalence of fluorosis, using the Dean Index, was 19.0% and 34.3% in non-fluoridated and fluoridated areas respectively. These figures were well above historical standards, i.e., 12.2% in Kewanee, Illinois (0.9 ppm F) as reported by Dean (1942). Riordan investigating risk factors for fluorosis among 7 year olds (Riordan, 1993a) and 12 year olds (Riordan and Banks, 1991), reported that residence in a fluoridated area (especially for a period of more than 2.5 years), risk factors included the use of fluoride supplements, weaning from breast feeding before the ninth month, and liking and swallowing toothpaste. Puzio, Spencer and Brennan (1993) also reported that exposure to water fluoridation, use of infant formula and fluoride tablets were risk factors for fluorosis among 10 – 17 year old South Australians[5, 6]. The findings suggested that the postulated threshold fluoride intake for the development of fluorosis (0.05 to 0.07mg/kg body weight/day). Burt in 1992 was being exceeded in a proportion of children, irrespective of the fluoridation status of the water supply[7]. However a small proportion of affected children and their parents both recognized and reacted to the tooth colour changes because of fluorosis. For many children or their parents the risks of fluorosis were identified, but often there was little appreciation of the benefits for the child and the community of decreased caries experience. Also, there is often an assumed capacity to maintain this low caries experience without the use of fluoride and

risk of fluorosis. Riordan in 1993 also reported on the perceptions of fluorosis by laypersons and professionals[8]. As the severity of fluorosis increased from TF 0 to 3, there was a general decline in agreement expressed to the statement "The appearance of these two teeth is pleasing and looks nice." Hoskin and Spencer (1993) in South Australia also reported that fluorosis was a significant factor in the satisfaction with colour and the appearance of teeth for South Australian children aged 10 – 17 years old. Fluorosis was a significant factor in parents' dissatisfaction with the colour of their child's teeth, even in the presence of factors for malocclusion. The findings from these and other studies have initiated a process of review that is reconsidering the topic of risks and benefits from fluoride use. In India a policy response to these issues was developed and stress was layed on the reduction in fluorosis by controlling the water fluoride levels and by making people aware about fluoride[9]. By 1995 all three major toothpaste manufacturers had introduced low fluoride concentration children's toothpaste and greater attention was provided for consumer advice on its use. The advice was specific at using a pea-sized amount of toothpaste, using low concentration fluoride toothpaste, delaying tooth brushing with toothpaste until after 24 months of age, and encouraging rinsing and expectorating after brushing. Several school dental services were done to minimize the risk factor and making people aware about it[10].

2. Methods:

The different parent study's sample was chosen using a multistage, stratified random selection with probability of selection proportional to population size. Fluoride exposure history was retrospectively collected by a parental questionnaire. Children were selected by year of birth to form three birth years: those born in 2008, 2009 and 2010. Children were approached in two further stages: a dental health perception questionnaire, and a clinical examination for fluorosis. Many children took part in the first stage. Among those, one trained dentist examined approximately 100 children for fluorosis under clinic conditions using two indices (the Fluorosis Risk Index (Pendrys, 1990) and the TF Index (Thylstrup and Fejerskov, 1978)). The Dental Aesthetic Index score (DAI) was also recorded with Dean's fluorosis index. Caries experience extracted from dental records of all previous visits to school dental clinics was used to enable calculation of DMFT/DMFS scores at different anchor ages. Percent lifetime exposure to fluoride in water and patterns of discretionary fluoride use were calculated. Fluorosis data were used to calculate the prevalence and severity of fluorosis. Caries DMFT/DMFS scores were calculated at different anchor ages to enable comparison between birth years.

3. Results and Discussion:

A higher proportion of children in the later birth years used low concentration fluoride toothpaste, and a smaller amount of toothpaste was used when they commenced tooth brushing. There was a significant decline in the prevalence of fluorosis across the three successive birth years. Risk factors for fluorosis as defined by the two indices were use of standard fluoride toothpaste, an eating and/or licking toothpaste habit, and exposure to fluoridated water. Evaluation of the "trade-off" between fluorosis and caries with fluoride exposure indicated that the use of low concentration fluoride toothpaste and preventing an eating/licking of toothpaste habit could reduce the prevalence of fluorosis without a significant increase in caries experience.

Conclusion: There was a marked decline in the prevalence of fluorosis across the three successive birth years. The decline was linked with the reduction in exposure to fluoride. Exposure to fluoridated water and several components of toothpaste use were risk factors for fluorosis. Establishing an appropriate use of fluoride toothpaste could be successful in reducing fluorosis without a significant increase in caries experience.

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