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Commentary

Dental fluorosis and periodontium: A game of shadows?

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ABSTRACT

Dental fluorosis is a condition which is said to be present when the morphologic features of a tooth are altered clinically, in the form of discoloration or anatomic malformation which is attributed to the developmental changes induced by excess fluoride levels in plasma at the time of tooth formation. In India, an estimated 60 million people are at risk and 6 million people are disabled due to fluorosis. Lack of understanding into the effects of fluorosis on periodontium has left a blind spot in the vision of management of periodontitis in such patient groups. This article suggests the important connection these two conditions can have and emphasize research in this study field.

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Dental fluorosis is a condition which is said to be present when the morphologic features of a tooth are altered clinically, in the form of discoloration or anatomic malformation which is attributed to the developmental changes induced by excess fluoride levels in plasma at the time of tooth formation. In India itself, an estimated 60 million people are at risk and 6 million people are disabled. Also, about 600,000 might develop a neurological disorder as a consequence.¹ Dental fluorosis is known for the changes it induce in the hard tissues of the body but not much attention has been given to its relation with the surrounding periodontal structures. Similarly, Even though a limited studies does consider the prevalence of periodontitis in fluorosis subjects.^{2,3} A little literature or no literature is present regarding the progress of periodontal disease in fluorosis affected population.

Fluorosis is known to cause hypoplastic changes in tooth enamel. Pits, striations and discolorations are common observations in fluorosed teeth.⁴ Apart from this fluorosis can

even induce gross morphological changes in the form of root malformations⁵ Although great detail has been studied about the changes fluorosis induce at the structural level, not much of attention has yet been given to the cytological aspects, except to that in animal studies. Fluoride intoxication resulted in hypercementosis by failure of resorption of cementum.⁶ Reddy et al in their study reported calcification of muscular attachments, ligaments and ossification on histopathologically which interferes with the functional movement of skeletal system.⁷ But the changes induced by fluorosis in periodontal cells at development stage of tooth or the changes induced later by continuing consumption of such excess fluoride has paucity of literature.

Also, fluoride has also been found to influence pattern of distribution of serum proteins.⁸ It also contributes to genetic alterations inducing up-regulation and down-regulation of genes.⁹ Its influence on MMP-20 is known for it to contribute to

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dental fluorosis in rats.¹⁰ Considering all this evidence, it can be said that fluorosis has the potential not only to influence the periodontium cytologically but molecularly as well, thereby modifying enzymatic actions as well as protein formation.

Even after continuing with the age old logic of structural changes that take place in mottled enamel it can be said with scientific plausibility that this factor of surface roughness can or must influence some of the variables in this multi-factorial disease of periodontitis. Surface roughness, after analyzing with atomic microscopy revealed surface roughness is exceedingly high in fluorosis subjects with roughness increasing with degree of fluorosis.¹¹ This surface roughness is conducive for the bacteria to survive as well as make it difficult for scaling and root planning in fluorosed teeth. This could also jeopardize the effectiveness of the regular oral hygiene procedures.

Going by molecular aspect as well, the excess of fluoride in water can not only influence the microbial flora but it remains to be studied the influence of this (possibly) altered microbial flora on the already altered/modified oral tissues. Fluorosis does affect the composition of saliva as well modifying the electrolytes¹² as well as the anti-oxidant properties in many ways. Gavriliuk LA et al in their studied pointed to dose-dependent fluoride intoxication and metabolic imbalance.¹³ This changed anti-oxidant capacity of saliva can influence the integrity of periodontal tissue as well but it remains to be studied.

Thus it can be clearly emphasized by the means of this article that although the effect of fluoride on caries has been discussed in painstaking detail but the effect of fluorosis on the periodontium yet remains in shadow. This might help understand the disease and aid its management as a large part of world including India millions are still affected with fluorosis.

Conflicts of interest

All authors have none to declare.

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