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EDITORIAL

Dental Fluorosis—A Boon or Bane?

Fluorine is a highly active gaseous element found widely in nature. Fluoride in small doses is beneficial for preventing dental caries and is commonly used in the prevention of dental caries. However, long-term excessive fluoride intake will affect human health, causing chronic fluorosis. Chronic fluorosis is a systemic disease; high doses of fluoride lead to bioaccumulation in the body, especially hard tissues such as bones and teeth, and primarily harm them. Besides skeletal and dental damage, excessive exposure to fluoride can also cause other nonphrenological hazards, such as metabolic, structural, and functional damage to the nervous system, kidneys, liver, cardiovascular system, and reproductive system.

Chronic fluorosis is an endemic disease; it is endemic in at least 25 countries across the globe, China and India being the worst affected among them. Most cases of fluorosis were caused by drinking fluorous water. In China, fluorosis is caused by drinking water as well as inhaling combustion fumes of coal being used as an indoor fuel source. Guizhou is one of the most severely afflicted areas of endemic fluorosis in China and this occurrence is due to indoor coal burning. Another type of fluorosis is brick tea-type fluorosis, due to fluoride accumulation in brick tea. It is more prevalent in Tibet than in other regions of China. It is also worth noting that chronic exposure to volcanic environments may lead to the exposure of excessive amounts of fluoride. It is estimated that more than 10% of the worldwide population live within the potential exposure range of some active or historically active volcano, either erupting or in a post-eruption phase.

In recent years, numerous studies focused on the molecular mechanisms associated with fluoride toxicity. Although the underlying mechanisms of chronic fluorosis is still not well understood, the results of the previous studies indicated that fluoride can induce oxidative stress; regulate intracellular redox homeostasis; and lead to mitochondrial damage, endoplasmic reticulum stress, and alteration of gene expression. Other mechanisms include enzyme inhibition, induction of apoptosis and cell cycle arrest, etc.[1]

A recent review by Vandana KL has reported a series of two decades' research studies pertinent to effect of dental fluorosis on periodontal tissues during health and disease as well as the dental treatment modifications for dental fluorosed subjects. The research studies involved use of scanning electronic microscopic, histopathologic, light microscopic evaluation on fluorosis-induced changes in tooth dentin, cementum and periodontal tissues has been considered. The clinical in vitro studies have evaluated root biomodification and different scaling procedures, various brushing methods and laser irradiation on dental fluorosed and nonfluorosed teeth. The dentinal hypersensitivity occurrence to be higher in dental fluorosed subjects has been reported.[2] The effect of dental fluorosis on dental caries is well discussed compared to its effects on periodontal health and disease. The above review is one of its kind, wherein the author is being continuously associated with dental fluorosis and its effects on periodontium.[2]

The toxic effects of fluorosis are being discussed by scientific mights like WHO, UNICEF and Fluoride Societies. Fluorosis is a national health problem and the toxic effects can be stopped by nationwide health promotional activities to deal with grave problems of medical and dental interest. To achieve this, the fluoride-induced systemic changes can be made known through educational programs so as to initiate preventive programs. The dentist plays a vital role of visualizing fluorosis-induced dental stains, which is one of the important signs available out of all the fluoride-induced toxicities. Hence there is a need to familiarize with hidden fluoride toxicities along with dental stains, so as to prevent further health deterioration.

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References

1. Liming Shen, Chengyun Feng, Sijian Xia, Yan Wei, Hua Zhang, Danqing Zhao, et al. Progressive Research in the Molecular Mechanisms of Chronic Fluorosis. Environmental Chemistry and Recent Pollution Control Approaches of Chronic Fluorosis. DOI: http://dx.doi.org/10.5772/intechopen.84548.
2. Vandana KL. Fluorosis and periodontium: A report of our institutional studies. J Int Clin Dent Res Organ 2014;6:7–15.