

**FLUOROSIS: CLINICAL FEATURES, DIAGNOSIS, AND TREATMENT
APPROACHES**

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Abstract. Fluorosis is a health condition caused by excessive intake of fluoride over a prolonged period. It commonly affects the teeth and bones, leading to dental fluorosis and skeletal fluorosis. This condition is more prevalent in regions where fluoride levels in drinking water exceed recommended limits. The purpose of this article is to examine the clinical characteristics of fluorosis and discuss modern approaches to its diagnosis and treatment. The study analyzes existing medical literature and clinical observations regarding fluorosis management. The results show that early detection and appropriate treatment strategies significantly improve patient outcomes. Preventive measures such as controlling fluoride exposure and promoting public health awareness are essential in reducing the incidence of fluorosis.

Keywords: fluorosis, dental fluorosis, skeletal fluorosis, fluoride exposure, enamel defects, diagnosis, treatment, public health prevention.

Introduction. Fluoride is a naturally occurring mineral widely present in soil, water, and certain foods. In small amounts, fluoride plays a beneficial role in preventing dental caries by strengthening tooth enamel. However, excessive fluoride intake can lead to fluorosis, a chronic condition that affects both dental and skeletal systems.

Fluorosis is a public health concern in many regions around the world where groundwater contains high concentrations of fluoride. Long-term exposure to elevated fluoride levels can cause structural changes in teeth and bones. Dental fluorosis is usually characterized by discoloration and mottling of tooth enamel, while skeletal fluorosis affects bones and joints, potentially leading to pain, stiffness, and deformities.

The severity of fluorosis depends on several factors, including the duration of fluoride exposure, the concentration of fluoride consumed, nutritional status, and individual susceptibility. In children, excessive fluoride intake during tooth development can lead to permanent changes in enamel formation.

The aim of this study is to analyze the clinical manifestations of fluorosis and review current diagnostic and treatment approaches used in clinical practice.

This study is based on a qualitative analysis of scientific publications, medical guidelines, and clinical reports related to fluorosis. Relevant literature was collected from peer-reviewed journals, medical databases, and public health reports.

The selection criteria included publications focusing on the pathogenesis, clinical features, diagnosis, and treatment of fluorosis. Studies addressing both dental and skeletal forms of the disease were reviewed.

Information was categorized into several key areas: clinical symptoms, diagnostic techniques, and treatment strategies. Comparative analysis was performed to identify the most effective management approaches currently used in clinical settings.

In addition, observational data from previously reported clinical cases were considered to better understand how fluorosis progresses and how patients respond to treatment interventions.

The analysis of available literature indicates that fluorosis manifests in two main clinical forms: dental fluorosis and skeletal fluorosis.

Dental fluorosis usually appears during childhood when excessive fluoride interferes with enamel formation. The earliest signs include small white streaks or spots on the surface of teeth. As the condition progresses, teeth may develop yellow or brown discoloration and surface irregularities.

Skeletal fluorosis develops after long-term exposure to high levels of fluoride, typically over several decades. Patients may experience joint stiffness, bone pain, and limited mobility. In severe cases, bone deformities and calcification of ligaments can occur.

Diagnosis of fluorosis primarily involves clinical examination and patient history. Dentists and physicians evaluate fluoride exposure from drinking water, diet, and dental products. Radiographic imaging is often used to detect skeletal changes associated with advanced fluorosis.

Treatment strategies depend on the severity of the condition. Mild dental fluorosis may be managed with cosmetic dental procedures such as enamel microabrasion, bleaching, or dental veneers. In more severe cases, restorative dental treatments may be required.

For skeletal fluorosis, the most important intervention is reducing fluoride intake. Nutritional support, physical therapy, and medications for pain management may help alleviate symptoms. In advanced cases, surgical interventions may be necessary to correct bone deformities.

The findings of this study highlight the importance of early detection and prevention of fluorosis. Since fluorosis develops gradually, identifying excessive fluoride exposure at an early stage can prevent severe complications.

Public health measures play a critical role in controlling fluorosis prevalence. Monitoring fluoride levels in drinking water and implementing water treatment technologies can significantly reduce the risk of the disease in affected regions.

Education is another key factor in prevention. Communities should be informed about safe fluoride consumption levels and the potential risks associated with excessive intake.

From a clinical perspective, interdisciplinary collaboration between dentists, physicians, and public health specialists is essential for effective fluorosis management. Early diagnosis allows healthcare professionals to apply minimally invasive treatments and improve patients' quality of life.

Further research is needed to develop more advanced therapeutic approaches and to better understand the long-term effects of fluoride exposure on human health.

Conclusion.

Fluorosis remains a significant health concern in many parts of the world where fluoride exposure exceeds safe limits. The condition primarily affects dental and skeletal tissues, leading to both cosmetic and functional problems.

Effective management of fluorosis requires a combination of early diagnosis, appropriate treatment, and preventive strategies aimed at reducing fluoride intake. Public health initiatives and community education are essential components in addressing this issue.

Future studies should focus on improving diagnostic methods and developing more effective treatment options to reduce the burden of fluorosis worldwide.

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