

MANAGEMENT OF DENTAL FLUOROSIS USING CONSERVATIVE COSMETIC APPROACHES: A CASE SERIES

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Abstract

Dental fluorosis is a common aesthetic concern caused by excessive fluoride intake during enamel formation. It leads to intrinsic staining, which can significantly impact a patient's self-confidence and social interactions. Various treatment modalities, including bleaching, composite veneers, and ceramic veneers, offer promising solutions to improve aesthetics while preserving tooth structure. This case series presents four patients treated with different cosmetic approaches to manage fluorosis-induced discoloration.

Key words : Dental fluorosis, Intrinsic staining, Bleaching, Composite veneers, Ceramic veneers.

Introduction

Tooth discoloration is one of the most frequent concerns in dental practice, particularly in anterior teeth. Among intrinsic discolorations, dental fluorosis is prevalent and results from excessive fluoride ingestion during the early years of life. This leads to permanent hypo mineralization of enamel, causing discoloration that ranges from mild white opacities to severe brown stains and surface pitting. The fluoride content in drinking water between 0.7–1.2 ppm is considered optimal, while levels exceeding this range increase the risk of fluorosis (Fejerskov et al., 1996).

Although the enamel defects in fluorosis are irreversible, their aesthetic impact can be managed through conservative cosmetic treatments such as bleaching, composite veneers, and ceramic veneers. These are the series of cases where different aesthetic interventions were used to address fluorosis-related discoloration.

Case Reports

Case 1

A 22-year-old male patient presented to the Department of Conservative Dentistry and Endodontics with the chief complaint of brown stains on his front teeth. The discoloration was present since childhood, and similar dental characteristics were reported in family members. The patient had no relevant medical or dental history. The treatment involved vital bleaching followed by composite veneer placement to enhance aesthetics.

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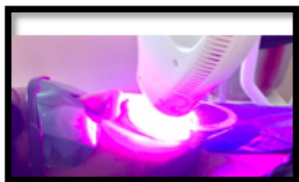
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Pre-Operative



Isolation



Power-Bleaching



Post-Operative

Case 2

The second case involved a patient with a similar presentation as Case 1. The treatment plan was identical, involving vital bleaching.



Pre-Operative



Post-Operative

Case 3

In this case, the patient underwent a conservative approach with vital bleaching as an initial step, followed by the placement of composite veneers to enhance esthetics. The treatment effectively masked the discoloration while preserving the majority of the natural tooth structure.



Pre-Operative



Post-Operative

Case 4

For this patient, a more durable aesthetic solution was chosen. After vital bleaching, ceramic veneers were placed to provide long-term colour stability

and enhanced aesthetics. Ceramic veneers offer superior translucency and stain resistance, making them a preferred option for moderate-to-severe fluorosis cases.



Pre-operative



Root Canal Treatment wrt 11, 12



Core Build Up Cementation



Tooth Preparation



Post Ceramic Veneer

Discussion

The presence of noticeable dental discoloration can have a significant impact on an individual's self-image, confidence, and social acceptance. Dental fluorosis is among the most common causes of intrinsic discoloration and is a frequent reason for seeking cosmetic dental care (Summitt et al., 2006).

Fluorosis-induced enamel defects range from mild opacities to severe brown stains with surface irregularities. The severity of fluorosis determines the choice of treatment, which can range from bleaching and micro-abrasion for mild cases to veneers or crowns for more severe cases (Heymann et al., 2013).

In this case series, bleaching was used as a primary treatment modality, given its minimally invasive nature. Bleaching is an effective, affordable method that works by oxidizing stain molecules within the enamel. The reaction involves the breakdown of hydrogen peroxide (H₂O₂), releasing nascent oxygen and per-hydroxyl ions, which

degrade high-molecular-weight organic molecules into smaller, less pigmented compounds (Sulieman, 2005). This process lightens the intrinsic stains and improves overall tooth appearance.

The bleaching process can be enhanced using light activation, typically with an LED lamp emitting wavelengths of 460–490 nm. This activates hydrogen peroxide, accelerating the release of free radicals and improving bleaching efficacy. A controlled light exposure of 5–8 minutes, repeated up to three times, can achieve optimal results (Joiner, 2010).

For cases where bleaching alone does not achieve the desired aesthetic improvement, veneering is a viable option. Composite veneers, as used in Cases 1, 2, and 3, offer a conservative, cost-effective solution that enhances aesthetics while preserving tooth structure. However, composite veneers may stain over time and require periodic maintenance (Roberson et al., 2013).

Ceramic veneers, as seen in Case 4, provide superior aesthetics, durability, and stain resistance. They are ideal for patients with moderate-to-severe fluorosis, where bleaching alone is insufficient. Though more invasive than composite veneers, they provide long-lasting aesthetic benefits with minimal biological cost when compared to full-coverage crowns (Rosenstiel et al., 2015).

Conclusion

The goal of cosmetic dentistry is to enhance aesthetics while minimizing tooth structure loss. The treatment of fluorosis-related discoloration depends on factors such as the severity of discoloration, aesthetic demands, occlusal considerations, and periodontal health. Bleaching remains the least invasive and most cost-effective

treatment, while composite and ceramic veneers offer enhanced and long-lasting aesthetic results. A patient-centred approach, considering individual needs and expectations, ensures optimal functional and aesthetic outcomes.

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How to cite this article:

Dr. Sarfaraaz Ahmed. S et al
Management Of Dental Fluorosis Using
Conservative Cosmetic Approaches: A Case Series
JDSR. 2025 Sep; 16(2): 1-5