

# In-Office Dental Bleaching and Enamel Microabrasion for Fluorosis Treatment

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*Recently, mostly as a result of drinking water fluoridation, the number of young patients affected by fluorosis increased considerably. This study describes a minimally invasive technique, using in-office dental bleaching (35% hydrogen peroxide) and enamel microabrasion (silicon carbide and 12% hydrochloric acid) to eliminate fluorosis like stains. The association of techniques was efficient and can be recommended as a good conservative alternative for the treatment of fluorosis affected teeth.*

**Keywords:** Fluorosis, dental bleaching, microabrasion.

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## INTRODUCTION

Recent advances in public health policies have provided unrestricted access to fluoride supplies through the fluoridation of drinking water in many communities. However, while a greater access to fluoridated water leads to reduction in caries prevalence indexes, it also results in an increased prevalence of enamel fluorosis.<sup>1-3</sup>

Several studies tried to clarify the mechanisms by which the fluoride might affect mineralized tissues.<sup>4-6</sup> It has been suggested that the severity of enamel fluorosis not only depends on the amount of fluoride ingested, but also the duration and stage of amelogenesis where the exposure occurred.<sup>7</sup>

Fluorosis affected enamel has been characterized as an altered structure prone to fracture and wear.<sup>8</sup> Clinically it appears as shades varying from white to brownish.<sup>9</sup> Histologically, the tissue presents hypomineralized sub-surface areas confined to few micrometers from the external mineralized surface, which increases its porosity.<sup>10</sup> Ultrastructural studies suggested the presence of highly uniform, flattened, hexagonal crystals in the outer regions of the affected tissue, while the inner region contains irregular crystal forms, more closely resembling those described in normal enamel.<sup>11-12</sup>

The etiology can be credited to an excessive fluoride supplement ingestion found in toothpastes, vitamin supplements, drinks, and infant food prepared with fluoridated water early in life.<sup>13</sup> The differential diagnosis is based on the bilateral symmetry of the defect. However, such adversities as the absence of bilateral teeth—similar clinical conditions caused by exposure to chemicals, drugs or physical agents, makes the correct diagnosis of enamel shade alterations difficult.<sup>14</sup>

The use of various acids to remove enamel stains was described as early as 1916.<sup>15</sup> Since then, many variations of this principle have been portrayed using different chemical agents.<sup>15, 16</sup> In the past, removal of sound structure and subsequent restoration was indicated as a treatment of fluorosis.<sup>7</sup> Nowadays, the combination of dental bleaching techniques and microabrasion appears an excellent conservative solution to re-establish health in fluorosis affected teeth.<sup>17</sup>

## AIM

This study outlines the combination of in-office dental bleaching and enamel microabrasion for the treatment of fluorosis-affected teeth. A representative case is documented.

## CASE PRESENTATION

The patient C.A.C. Jr (17-year-old) was seen at the Depart-

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Figure 1. Aspect after first bleaching session.



Figure 2. Microabrasive paste application.

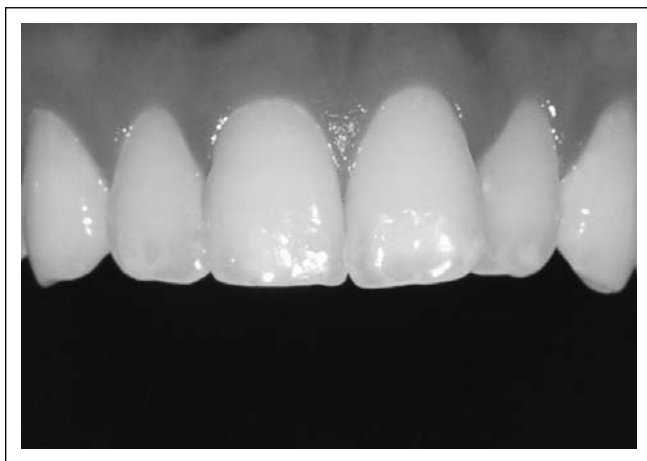


Figure 3. Final Aspect.

ment of Restorative Dentistry of the Pontifical University Catholic of Parana, Brazil. At the time, his main complaint was the discoloration of his maxillary anterior teeth. The anamnesis followed by the clinical examination led to the diagnosis of fluorosis. Different treatment options were discussed, including invasive treatments. The patient declined any procedure that included preparation of his intact tooth surfaces. After discussion, it was agreed to use the combined technique of in-office dental bleaching and enamel microabrasion to his maxillary and mandibular canines and incisors.

The teeth to be treated were first cleaned with pumice. Before the bleaching procedure, the soft tissues were protected with a polymeric barrier (Top Dan, FGM, Joinville, SC, Brazil). The bleaching agent, 35% hydrogen peroxide (Whiteness HP 35%, FGM, Joinville, SC, Brazil), was prepared according to manufacturer's instructions and then applied onto the buccal surfaces of the isolated teeth. The bleaching agent was photopolymerized for 20 seconds and the bleaching material properly removed (Figure 1). This procedure was repeated three times throughout two different sessions.

For the microabrasion, the teeth were isolated with a rubber dam. Petroleum jelly was applied around the cervical portion of the teeth to prevent leakage of the hydrochloric acid damage to the gingiva. A microabrasive paste (Whiteness RM, FGM, Joinville, SC, Brazil) composed of 12% hydrochloric acid plus silicon carbide was applied to the teeth, rubbed for 10 seconds using a plastic spatula and rinsed with water for 20 seconds (Figure 2). This procedure was repeated 12 more times. At the end of the session, the teeth were polished with fine polishing disks (Diamond Flex, FGM, Joinville, SC, Brazil). The patient was recalled after two weeks. The old restorations were changed and the teeth re-polished. A satisfactory result was achieved (Figure 3).

#### DISCUSSION

This technique appears to be an easy alternative in the dental practice. The treatment is not invasive or time consuming. Local anesthesia is not required and patient satisfaction appears to be high, whereas recurrence of the staining, post-operative sensitivity, or loss of vitality of treated teeth has not been reported.<sup>18</sup> It has been suggested that the balance of the smile is affected by intrinsic and extrinsic factors,<sup>19</sup> thus the absorption of external staining agents, such as tea or wine can mask the correct diagnosis. Therefore, in cases of generalized stains, the knowledge of type, nature and depth of the defect is essential for the correct treatment plan.<sup>21</sup> In this case, the patient described a history of fluoridated dentifrice ingestion over a prolonged periods of time during his childhood. His teeth exhibited white and opaque bilateral lesions, granting the diagnosis of fluorosis.

Fluoride appears to inhibit protein secretion by secretory ameloblasts at very high serum-fluoride levels.<sup>7</sup> Previous studies also indicated a direct inhibition of proteinases secreted into the enamel extracellular matrix.<sup>21</sup> As a result the organic process that guarantees the organization and structure of the enamel rods is defective. These findings emphasize our diagnosis, since the frequent ingestion of toothpaste during the patient's childhood might have led to high levels

of fluoride in his metabolism.

The successful combination of dental bleaching and enamel microabrasion has been reported.<sup>22-23</sup> Bleaching agents chemically react with the pigments in the dental structure, while the microabrasion mechanically removes the sub-superficial portion of the affected enamel, where the color alteration takes place. The option to proceed with microabrasion after bleaching, in this particular case, was taken after the bleaching procedure did not show full effectiveness. Additionally, over time, after microabrasion the ongoing intra-oral remineralization phenomena alters optical properties of the enamel glaze, in a beneficial way.<sup>24</sup>

The association of in-office dental bleaching and enamel microabrasion can be characterized as a conservative esthetic treatment for tooth shade alterations, allowing good results with little invasiveness and low cost, compared to crowns or laminate veneers.

## CONCLUSION

This clinical case presented the effectiveness of the association of in-office dental bleaching and enamel microabrasion – a low cost, noninvasive and easy procedure – for the re-establishment of health and esthetics of fluorosis affected teeth.

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## **The importance of family dining:**

This study from the National Centre on Addiction and Substance Abuse (CASA) is the fourth report regarding the importance of family dining in the United States.

1063 teenagers and 550 parents of teenagers were surveyed by phone. The study found a positive association between the frequency of family dinners and substance abuse.

59% of children and parents reported dining with their families at least 5 times a week compared to 51% in 1996.

84% of children preferred to eat with their families while 13% preferred to eat alone.

Frequent family dinners reduced significantly teen smoking and drinking, illegal drug use and prescription drug abuse.

These children when confronted with something important to them preferred to talk after meal time.