

## CASE REPORT

# Esthetic Rehabilitation of Teeth with Dental Fluorosis

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## ABSTRACT

High intake of fluoride causes developmental disturbances of tooth enamel leading to dental fluorosis. It produces mottling of enamel and its occurrence depends upon the quantity of fluoride ingested and the stage of tooth development. Esthetic management of mottled teeth is planned according to the severity of discoloration and the extent of surface aberrations. A combination of different techniques makes the teeth lighter in shade with a smoother surface. This case report describes the management of fluorosed teeth which is discolored and pitted on the surface by minimally invasive procedures.

**Keywords:** Enamel microabrasion, Nightguard, Bleaching, Enamel mottled, Carbamide peroxide.

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## INTRODUCTION

An environmental disturbance during the formative stage of tooth produces defects in mineralized structures which may produce morphologic and structural changes on dental hard tissues. Excessive intake of fluoride at an early stage of life result in defective enamel formation due to hypomineralization.

Initial change due to fluorosis is that it produces sub-surface enamel porosity which may extend to deeper layers according to its severity.<sup>1</sup> These enamel dysmineralizations appear as white opacities or brown or orange opaque spots or streaks combined with superficial defects of enamel.<sup>2</sup> These surface changes combined with discoloration in the anterior teeth may raise concerns about the personnel appearance of an individual.

Esthetic management of roughened and discolored teeth requires smoothing of surface tooth structure and bleaching of affected teeth. Macroabrasion and microabrasion are

minimally invasive procedures done to make a smooth enamel surface. Bleaching is a noninvasive technique effective for tooth discoloration. Macroabrasion involves application of fine diamond or carbide finishing bur on tooth surface at light pressure to remove gross surface defects. In microabrasion, tooth is subjected to a combination of an acid and an abrasive which facilitates and removes the surface enamel layer. This technique alters outer enamel surface which corrects enamel dysmineralization, decalcification defects, and discolorations limited to the outer tooth surface.<sup>3</sup> In vital bleaching method, tooth is subjected to the action of hydrogen peroxide which diffuses through enamel and dentin to disrupt the organic molecules of discoloration resulting in lightening of tooth shade.<sup>4</sup>

Procedure of microabrasion began as a treatment for teeth affected by fluorosis. It was done by applying dilute hydrochloric acid (18%) after mixing with pumice slurry.<sup>5</sup> Several commercial products are in the market for microabrasion which can readily be applied using rotary brush giving satisfactory results. Tooth bleaching materials are of diverse types and are of different concentrations which are applied safely to get excellent results. Carbamide peroxide is a well accepted material for home bleaching at 10% and is applied after loading in custom made tray.<sup>6</sup> A higher concentration of carbamide peroxide was found to increase the efficacy bleaching process.<sup>7</sup>

Teeth discolorations associated with surface roughness presents a variety of treatment options. A combination of different treatment modalities has to be adapted to achieve a satisfactory result. The following case describes management of tooth discoloration combined with surface roughness by using macroabrasion, microabrasion and vital bleaching techniques.

## CASE REPORT

A 32-year-old male presented to the clinic with complaints of generalized staining of teeth, which affected his self esteem and confidence. According to him, his teeth were stained from childhood, but later he became aware as it became noticeable. All the teeth were discolored with lateral incisors and canines having brown staining and horizontal banding combined with roughness upto middle third of teeth. The incisal third was free of stains and it was extending from middle third to cervical third (Fig. 1). This condition was identified as enamel hypoplasia of

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**Fig. 1:** Preoperative photograph



**Fig. 2:** Microabrasion procedure



**Fig. 3:** Teeth after microabrasion



**Fig. 4:** Teeth after bleaching

environmental origin, related to fluorosis as he was from an area with endemic fluorosis and his history did not have an episode of tetracycline medication during childhood.

He had an intense desire to make his teeth whiter and, after oral prophylaxis, it was decided to do a combined approach as the roughness and discoloration was not of uniform nature. It was decided to start with macroabrasion of the deeply involved lateral incisor and canine teeth by applying tapered fine grit diamond in high speed under waterspray for about 10 seconds. Microabrasion was the next step to make a smoother surface. The teeth were isolated with Opal Dam (Ultradent, Jordan, USA) which also offered gingival protection. The material Opalustre (Ultradent, Jordan, USA) is an enamel microabrasion slurry containing 6.6% HCl and silicon carbide microabrasive. It was applied on the labial surface from premolar to premolar area and was rubbed firmly with Opal cups (Ultradent, Jordan, USA) at slow speed for 60 seconds each (Fig. 2). After rinsing, the teeth were treated with topical fluoride (Ultradent, Jordan, USA) and was polished with Opal trophy cups (Ultradent). The application was repeated after 1 week. After microabrasion, the tooth surface was smooth and much lighter (Fig. 3). He was put under home bleaching sessions to remove traces of remaining stains. He was instructed for nightguard bleaching starting with 15% carbamide peroxide for one week and 10% carbamide peroxide for another 2 weeks using custom made tray which he wore overnight. He had mild sensitivity initially for 2 days and then it subsided without any medication. After home bleaching sessions, his teeth

appeared whiter and as he was satisfied with the appearance the bleaching session was discontinued (Fig. 4). He was advised to use Tooth Mousse Plus (GC, Japan) which is a casein phosphopeptide-amorphous calcium phosphate fluoride (CPP-ACPF) preparation for 1 month.

## DISCUSSION

Dental fluorosis causes aberrations in morphology and discoloration of teeth, which may be mild moderate or severe. This was a case of moderate dental fluorosis with brown horizontal bands of discoloration which was symmetric in appearance and generalized. Teeth with moderate dental fluorosis are satisfactorily managed with minimally invasive techniques, like microabrasion and bleaching.<sup>8</sup>

Macroabrasion is a procedure done to remove isolated surface defects and stains. When it is done along with microabrasion, it removes localized grooves, defects and superficial tooth enamel discolorations to give a lighter shade with a smoother finish. Initially, an application of fine grit tapered diamond bur was done on lateral incisors and canine to remove gross surface defects followed by microabrasion. Discolorations due to fluorosis are usually confined to enamel surface only and microabrasion efficiently removes superficial discoloration and it also creates a highly polished surface layer.<sup>9</sup> Presence of mild discoloration after microabrasion was removed by doing vital home bleaching.<sup>4</sup> Patient experienced mild sensitivity for 2 days at the beginning, but no treatment was necessary. Prior use of topical fluoride is found to reduce sensitivity by blocking the

dentinal tubules.<sup>10</sup> Procedure, like microabrasion and bleaching, may produce mild alterations and demineralization of enamel surface.<sup>11,12</sup> However, these changes are found to be clinically insignificant due to the repairs occurring due the precipitation of the salivary minerals.<sup>12</sup> Use of CPP-ACPF further replenishes the mineral content of tooth.

## CONCLUSION

Microabrasion is an effective method to manage tooth with moderate fluorosis aided by the procedure of macroabrasion. It minimally alters the superficial structure of tooth to give a smooth appearance in addition to the removal of surface discolorations. Bleaching of teeth after microabrasion modifies the appearance further to give a satisfactory result.

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