

Microabrasion- A Minimal Invasive Approach For Fluorosis



Medical Science

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ABSTRACT

Enamel microabrasion is an alternative treatment to eliminate enamel irregularities and discoloration defects, thus improving the teeth appearance. Enamel microabrasion improves the appearance of the tooth by restoring bright and superficial smoothness, without causing significant structural loss especially in young patient. Tooth discoloration is an aesthetic problem for certain patients. The aim of this paper was to report the clinical cases of two patients whose aesthetics was re-established using enamel microabrasion technique, with 18% hydrochloric acid and pumice slurry. This method has been shown to be a safe and efficient method for removing fluorosis stains. Microabrasion followed by composite restoration may be considered as an alternative treatment for discoloured teeth.

Introduction-

Fluoride is considered as “double edge sword” as it has both beneficial and detrimental effects on the dentition, first documented by Mc Kay and G. V. Black in 1916.¹ The beneficial effects of fluoride are attributed to the topical effect of fluoride after the teeth have erupted in the oral cavity. On contrary, detrimental effects are attributed to systemic absorption during tooth development which results in dental fluorosis that is one of the most common forms of enamel demineralisation.¹ It begins as subsurface hypomineralization and/or porosity of the enamel that may have potential to involve the whole thickness as the severity increases.² The enamel discoloration can vary from yellow to dark brown. Enamel discoloration is a prime esthetic concern especially in the anterior teeth.³ Teeth discoloured by fluorosis can be treated by various methods like bleaching, microabrasion, veneering or esthetic crowns. The treatment choice depends upon severity of disease.⁴ However, in most of severe cases treatment option is often invasive. The problem with invasive treatments is that most patients are young adults with a life expectancy of many decades. The use of invasive procedures in the form of a prosthetic approach with veneers or crowns results in compromise of tooth structure, thereby promoting the destruction of the tooth at an early age.⁵ Furthermore, a restorative approach is expensive as well as time consuming. Conservative non-restorative methods such as microabrasion technique have been used in the treatment of demineralization defects and discolorations of teeth.⁴ The aim of this paper is to describe and illustrate two case reports by using a minimally invasive technique that improves the esthetic aspect of teeth with moderate enamel fluorosis without requiring any invasive techniques.

Case Report-1

An eight year old female patient reported to department with the chief complaint of dark brown staining of the anterior teeth (figure 1a). Her parents wanted the least invasive and most cost-effective treatment to enhance her esthetics. Medical history and past dental history revealed no contraindications to dental treatment. Clinical examination revealed significant staining on the maxillary and mandibular anterior teeth, with light brown pitting in the middle third of the facial surfaces. A diagnosis of moderate fluorosis determined by using Dean's Fluorosis Index⁶ was made. A treatment plan was presented to the patient that would cover his request for minimally invasive treatment which proposed mi-

croabrasion of the superficial enamel. The affected teeth were isolated with a rubber dam to protect the gums from coming into contact with the acid (18% HCl) (figure 1b). The pumice-acid slurry was first applied to the facial surfaces of the maxillary teeth followed by mandibular teeth (figure 1c) using cotton and rubbed with a very slow speed rubber cup by using a right angle latch type slow-speed hand piece running the motor at 1,000rpm. A hybrid bristle brush-cup was used to rub the pumice acid slurry for three separate applications of 30 to 40 seconds each. Between each application, the slurry was rinsed and dried from the tooth surfaces. This procedure was repeated three times. After a few layers of enamel are removed, the slurry was rinsed with water and the result was evaluated. After the process was complete, topical fluoride gel application was done in order to reduce postoperative sensitivity. After topical fluoride application, shade selection was done and composite restorations (3M ESPE, USA) were placed (figure 1d). The rubber dam was removed and the patient viewed the result of treatment. She was pleased with the result from the immediate removal of the dark staining on his maxillary and mandibular anterior teeth. Patient was instructed to use casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) paste (GC Tooth Mousse, Recaldent, GC Europe).

Case Report- 2

An eleven year old male patient reported to department with the chief complaint of dark brown staining of the upper and lower anterior teeth (figure 2a). His parents also wanted a least invasive and cost-effective treatment to enhance his esthetics. From the appearance of his teeth, diagnosis of moderate fluorosis staining was determined by Dean's Fluorosis Index⁶. The most significant staining occurring on the maxillary and mandibular anterior teeth contained dark brown streaks in the middle third of the facial surfaces. The same procedure for the microabrasion was repeated as in previous case was done (figure 2b & C). After the procedure was completed, topical fluoride gel application was done to reduce the postoperative sensitivity. After topical fluoride application, shade selection was done and composite restorations (3M ESPE, USA) were placed (figure 2d). The rubber dam was removed for the evaluation of the result by the patient. The patient was quite satisfied with the results. The patient and parents were quite satisfied with the results. In the above mentioned both the cases, patients were asked not to eat, or drink

anything that could possibly stain the teeth for 24–48 hours after the treatment.

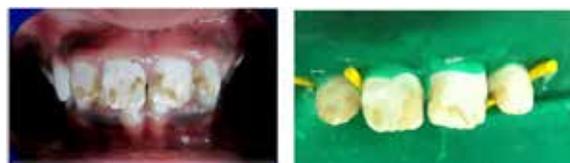
Discussion-

Dental fluorosis is a developmental disturbance of dental enamel, caused by subsequent exposures to high concentrations of fluoride during tooth development, leading to enamel with lower mineral content and increased porosity.¹ The severity of which depends on when and for how long the overexposure to fluoride occurs, the individual response, weight, degree of physical activity, nutritional factors and bone growth, suggesting that similar dose of fluoride may lead to different levels of dental fluorosis.⁴ It has typical picture of diffuse opacities on the enamel surface. In mild form, teeth presents with small white streaks and the enamel appears mottled and, in severe form of the condition black and brown stains develops. Enamel microabrasion technique is an effective method of removing intrinsic enamel stains of any etiology and colour, as well as to correct superficial irregularities on the buccal aspect of enamel, caused by either amelogenesis imperfecta or any other defects⁷. This technique involves mild acid etching in combination with rotary application of an abrasive medium was first described by Dr. Walter Kane (Colorado Springs, 1916)⁸. Since the results obtained were favorable, researches were developed in order to verify the effectiveness of the microabrasion technique using different concentrations of hydrochloric acid (6.6% to 18%) and phosphoric acid (30% to 40%) in association with abrasives⁹. However, for more than 60 years, most clinicians avoided applying this technique, because of fear of damage or destruction of the enamel. In 1984, McCloskey¹⁰ introduced the use of acid combined with pumice. Croll⁵ two years later named this method as “microabrasion”. In the present paper we used the technique of microabrasion to remove the unesthetic brown enamel under rubber dam protection followed by application of application of topical fluoride for 5 to 15 minutes. This can be explained by two reasons, as it reduces the risk of post-treatment sensibility as well as protects teeth from possible external demineralization. Segura *et al*¹¹ reported that teeth treated with microabrasion followed by a 4-minute application of 1% neutral topical sodium fluoride exhibited significantly less enamel demineralization when subjected to an artificial caries challenge than did teeth that underwent microabrasion alone, topical fluoride treatment alone, or no treatment at all. After microabrasion, the teeth results into an unnaturally smooth appearance, followed by composite resin restoration, will help to enhance esthetics.

Conclusion-

Minimally invasive technique microabrasion is used to treat enamel fluorosis thereby allowing it for natural tooth appearance, dramatically decreasing the unhealthy brownish enamel aspect. This method has the advantages of being extremely conservative and very well accepted particularly by the young patients. Moreover, this technique presents a favourable and lasting aesthetic result, without causing significant enamel structural loss and without need for cavity preparations.

CASE REPORT- 1 (Figure 1)

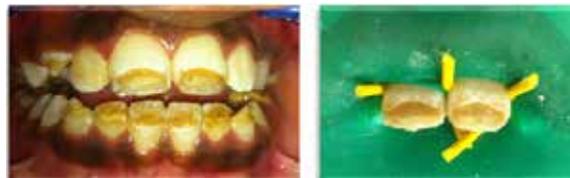


a & b



c & d

CASE REPORT- 2 (Figure 2)



a & b



c & d

Illustration of figures-

Figure 1 shows-

- Intra Oral Photograph- Fluorosis
 - Isolation under Rubber dam & Application of HCl wrt 11, 12, 21, 22
 - Application of 6% HCl wrt 31, 41
 - Composite Restoration Done wrt 11, 12, 21, 22, 31, 41
- Figure 2 shows:

- Intra-oral Photographs – Fluorosis
- Isolation under Rubber Dam & Application of HCl done wrt 11, 21
- Application of 6% HCl wrt 31, 32, 41, 42
- Composite Restoration done wrt 11, 12, 31, 32, 41, 42

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