



RESEARCH ARTICLE

DENTAL FLUOROSIS THE MICROABRASION WAY OF MANAGEMENT -CASE REPORTS

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Manuscript Info

Manuscript History

Received: 10 April 2020

Final Accepted: 12 May 2020

Published: June 2020

Abstract

Superficial stains and irregularities of the enamel are generally what prompt patients to seek dental intervention to improve their smile. These stains or defects may be due to hypoplasia, amelogenesis imperfecta, mineralized white spots, or fluorosis, for which enamel microabrasion is primarily indicated. Enamel microabrasion involves the use of acidic and abrasive agents, such as with 37% phosphoric acid and pumice or 6% hydrochloric acid and silica, applied to the altered enamel surface with mechanical pressure from a rubber cup coupled to a rotatory mandrel of a low rotation micromotor. Enamel microabrasion is a technique that can be used to correct discoloured enamel. Enamel microabrasion was developed in the mid-1980s as a method of eliminating enamel discolouration defects and improving the appearance of teeth. Several years after the method was developed, much has been learned about this technique, long-term results of treatment, and microscopic changes to the enamel surface that have distinguishable clinical implications. microabrasion techniques showed highly significant successful results in esthetic management of enamel opacities clinically and in terms of patient's satisfaction.

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Introduction:-

Tooth enamel is unique among mineralized tissues. The formation of dental enamel is highly specialized, and the proteins most directly involved in enamel bio-mineralization are specific for it. As a consequence defects in the genes encoding enamel proteins generally cause enamel malformations. Developmental enamel defects can be qualitative or quantitative in nature and can present a wide range of clinical appearances. They can be classified into one of four types: hypoplasia, demarcated opacities, diffuse opacities, and discolored enamel.¹

One of such defect might occur by the excessive and chronic ingestion of fluoride during amelogenesis may lead to the appearance of dental fluorosis, characterized by white opaque area or discolorations ranging from yellow to dark brown occasionally in combination with porosities on the enamel surface. Its severity is directly related to the excessive fluoride intake, which may be present in tap water, dietary supplements, and other fluoride-containing dental products. The undesirable enamel stains may be masked by restorative or prosthetic treatments, or by a more conservative approach, to include enamel microabrasion and dental bleaching.²

Enamel microabrasion is a conservative method for removing enamel to improve discolorations limited to the outer enamel layer. Sundfeld, et al noted in an in vitro study that the enamel microabrasion technique results in a loss of enamel around 20-200 micrometer depending on the number of applications and acids concentration. The use of

various acids to remove enamel stains was described early, in 1916. Since then, many variations of this principle have been described. The enamel microabrasion technique has been suggested for aesthetic improvements, employing a mixture of 18% hydrochloric acid and silica carbide particles, or even 37% phosphoric acid gel associated with extra fine grain pumice in proportions of equal volume.³

Case Report:

Atwenty-five year-old-female patient came to the dental clinics for routine dental care. Her chief complaint was to remove and/or minimize the noticeable brown/yellow staining of her teeth. She wanted the least invasive and most cost-effective treatment to change her smile. A review of her medical history and past dental history revealed no contraindications to dental treatment. In consideration of her age, the patient was not interested in treatment options that involved significant removal of tooth structure, such as porcelain or composite resin veneers. From the appearance of her teeth, a diagnosis of mild fluorosis staining determined by using Dean's Fluorosis Index was sent on the anterior teeth in the aesthetic zone, with the most significant staining occurring on the maxillary anterior teeth, with light brown streaks in the middle third of the facial surfaces (Figure 1). A treatment plan was presented to the patient that would fulfill her request for minimally invasive treatment which proposed microabrasionof the superficial enamel. The teeth were isolated with a rubber dam to protect the gums from coming into contact with the microabrasive particles. The enamel surface was treated with an application ofthemicroabrasive product (Opalustre, UltradentProductsInc, South Jordan, UT, USA), three times on each of the three teeth at 60-second intervalswith a very slow speed rubber cup. Using a right angle latch type slow-speed hand-piece running the motor at 1,000rpm, a hybrid bristlebrush-cup was used to rub the pumice acid slurry for three separate applications of60 seconds each. Between each application, the slurry was rinsed and dried from the tooth surfaces. This procedure was repeated three times. At the completion of the microabrasion technique, the enamel surfaces were polished with a cup-shaped porcelain polishing rubber abrasive to smooth and polish the enamel surface. After a few layers of enamel are removed, the slurry was rinsed with water and the result was evaluated. This process is repeated until the stain is gone or the process must be stopped for other reasons (enamel getting too thin or tooth getting sensitive). After the process was complete, fluoride gel was placed on the teeth in order to reduce postoperative sensitivity. The entire process takes less than an hour and is permanent. The rubber dam was removed and the patient viewed the result of treatment (Figure).She was pleased with the result fromthe immediate removal of the dark staining on her maxillary anterior teeth.The patient was quite satisfied with the results. In the abovementioned cases, patients were asked not to smoke, eat, or drink anything that could possibly stain the teeth for 24–48 hours after the treatment. Following this the patient was prescribed with CPP-ACP containing toothpaste to enhance the remineralization of enamel.



Figure 1:- Preoperative photograph.



Figure 2:- Photograph following oral prophylaxis and rubber dam isolation.



Figure 3:- After 3 cycles of microabrasion agent.



Figure 4:- Follow up after 6 months.

Discussion:-

The aesthetic appearance of the teeth, which is key to a beautiful smile, is appreciated by all age groups and both genders. According to Welbury and Shaw aesthetic problems may psychologically affect patients, especially teenagers, and may interfere with their social life.⁴ In this case though the patient was only 25 years old, she was concerned about the aesthetic appearance of her teeth that led her to visit the dental hospital.

Dental fluorosis is defined as hypomineralisation of enamel resulting from excessive intake of fluoride during tooth development. It is characterized by diffuse opacities on the enamel surface. These are differentiated from other conditions by the characteristic bilaterally symmetric distribution of the enamel defects. The degree to which the enamel is affected is dependent upon the duration, timing, and intensity of the fluoride concentration. In its mild form, most commonly the teeth present with small white streaks and the enamel appear mottled. As the severity of the condition increases, black and brown stains develop.⁵

Enamel microabrasion has become accepted as a conservative, non-restorative method to improve the appearance of teeth with superficial demineralisation and decalcification effects. Literature shows that enamel microabrasion should be considered as the first treatment option when trying to improve aesthetics of teeth that present intrinsic stains (fluorosis) or extrinsic stains superficial enamel because it is a procedure that is less invasive and more conservative. It only requires a small amount of structure removal, does not cause postoperative pain or sensitivity and in majority of cases can be done in a single session causing minimum discomfort to the patient. Other advantages of this technique include immediate, permanent and lasting results due to the fact that microabrasion involves the removal of the stain instead of just covering up the stain or altering enamel the shorter time required for the procedure which is easy to carry out; avoiding dental cavity preparation materials for restorative and does not cause injuries either to the pulp or to the periodontal tissue.⁶

Enamel micro-abrasion followed by GC Mousse cream (CPP-ACP) application was the treatment of choice as micro-abrasion efficiently removes superficial stains, and remineralizing agent helps in improving the crystalline structure of enamel and hence reduces the chances of postoperative sensitivity and stabilizes the results.⁷. Results showed that this combination technique proved a better treatment option for fluorosis stains.⁸. Considerations regarding enamel micro-abrasion for fluorosis stains can be summarized as follows:

1. Age is not a limiting factor as the procedure is simple, conservative, and non-invasive of lesion, i.e., severe stains require more number of applications.
2. Number of applications is according to the extent of lesion, i.e., severe stains require more number of applications
3. Postoperative sensitivity can be observed, so the combination with remineralizing agent is preferred.
4. Not indicated in incompetent lip seal as continuous dehydration of enamel can appear as a failure of microabrasion
5. For better results, microabrasion can be used with bleaching technique in severe cases.

Conclusion:-

Microabrasion technique (with proper considerations, adjunct with remineralizing agents or bleaching, or the use of composite resin) results in improved esthetics and color uniformity of the teeth, restoring the patient's esthetics and self-esteem. It can be concluded that microabrasion along with remineralizing agents is an effective, noninvasive treatment for fluorosis stains.

References:-

1. Sheoran N, Garg S, Damle S, Dhindsa A, Opal S, Gupta S; Esthetic Management of Developmental Enamel Opacities in Young Permanent Maxillary Incisors with Two Microabrasion Techniques—A Split Mouth Study; *J Esthet Restor Dent*. 2014;25:345–352. •
2. Sundfeld D, Pavani CC, Pavesi Pini NI, Machado LS, Schott TC, Bertoz AP, et al. Esthetic recovery of teeth presenting fluorotic enamel stains using enamel microabrasion and home-monitored dental bleaching, *J Conserv Dent* 2019;22:401-5.
3. Sundfeld R, Sundfeld D, Machado L, Franco L, Fagundes T, Briso A; Microabrasion in tooth enamel discoloration defects: three cases with long-term follow-ups. *J Appl Oral Sci*. 2014;22(4):347-54.
4. Welbury RR, Shaw L. A simple technique for removal of mottling, opacities and pigmentation from enamel, *Dent Update* 1990;17:161–3.
5. R.H. Sundfeld, V. Rahal, T. P. Croll, R. S. De Aalexandre, and A. L. F. Briso. "Enamel microabrasion followed by dental bleaching for patients after orthodontic treatment—case reports," *J Esthet Restor Dent* 2007;19: 71–77.
6. Pandey P, Ansari AA, Moda P, et al. Enamel microabrasion for aesthetic management of dental fluorosis. *BMJ Case Rep* 2013. doi:10.1136/bcr-2013-010517.
7. de Vasconcelos AA, Cunha AG, Borges BC, Vitoriano J de O, Alves-Júnior C, Machado CT, et al. Enamel properties after tooth bleaching with hydrogen/carbamide peroxides in association with a CPP-ACP paste. *Acta Odontol Scand* 2012;70:337-43.
8. Deshpande AN, Joshi NH, Pradhan NR, Rao RY. Microabrasion-remineralization (MAB-re): An innovative approach for dental fluorosis. *J Indian Soc Pedod Prev Dent* 2017;35:384-7.
9. Doneria D, Keshav K, Singh Chauhan SP. A combination technique of microabrasion and remineralizing agent for treatment of dental fluorosis stains. *SRM J Res Dent Sci* 2018;9:145-7.