

A simple microabrasion technique as aesthetic approach on fluorosis of anterior teeth

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Received; January 12 2021, Revised, March 20, 2021, Accepted, May 2, 2021

ABSTRACT Dentistry treatment is not only focused on restoring the function of mastication but also on the aesthetic problem. Fluorosis is one of the aesthetic problems caused by excessive fluoride intake during email formation and produced color changes on the surface of the email. Fluorosis was not affected by the aesthetics but also influenced the confidence of the patient. The Microabrasion technique is an option for fluorosis because it is conservative treatment with good results. A 20-year-old woman who came to the Dental Conservation clinic complained that she wants to remove the brown color and white spots seen on the front teeth, which significantly interfere with her appearance. Based on clinical examination, many cavities were found in the back teeth of the upper and lower jaw. The results of the history and clinical study revealed that the patient had fluorosis in her teeth. Microabrasion was carried out using *Opalustre* (ultradent). This material was applied to the tooth surface and rubbed using an applicator (opal bristle) for 60 seconds. Then applied fluoride gel paste with finishing cup opal. Treatment results showed changes in tooth color, brown and white patches disappeared. Microabrasion is the first choice for aesthetic treatment in fluorosis and has shown satisfying results to restore the patient's aesthetics problem.

KEYWORDS: Fluorosis, microabrasion technique

INTRODUCTION

Recently, the aim of treatment in dentistry is to restore tooth function and improve aesthetics, especially to anterior teeth. In recent years, people have realized the importance of oral health, which impacts appearance and self-confidence. Aesthetics is essential, especially at a young age. Disturbances of aesthetics can be caused by discoloration that can occur in one or more teeth. Fluorosis is a development disorder of teeth that can cause aesthetic problems.¹⁻⁶

The proper use of fluoride has a positive impact on preventing tooth decay and is essential in public health programs to avoid activities of caries. The fluoride ion (F⁻) in the oral cavity at the time of tooth eruption is a facilitator for incorporating mineral crystals on the enamel surface and increasing the remineralization process. Excess fluoride intake can interfere with the growth and

development of enamel and produce a hyper-mineralized that can reduce the enamel hardness.⁶⁻¹¹ Fluorosis presents clinically in a variety of ways. The initial sign of fluorosis increases enamel porosity along the retzius striae and white patches with chalk-like perikymata lines on the tooth surface. Severe fluorosis is characterized by areas of brown porosity and the absence of enamel structure.¹⁰⁻¹²

Microabrasion techniques are a simple method that can improve aesthetics and is a conservative method that is usually indicated to remove intrinsic staining on the outer enamel. Microabrasion techniques can correct enamel irregularities due to imperfect enamel formation or after orthodontic treatment. Microabrasion is the first choice that should be considered a treatment in fluorosis cases to improve the aesthetic appearance of mild and moderate fluorosis cases. Apart from

How to cite this article: Sari MI, Satfil I. A Simple Microabrasion Technique as Aesthetic Approach on Fluorosis of Anterior Teeth. JDS. 2021; 6(1): 23-29

being used for the treatment of teeth with fluorosis, it can also be used for localized cases of hypoplastic enamel and the treatment of discoloration and opacity caused by the use of orthodontic appliances. According to Croll et al. (2013), the microabrasion

technique is the first choice in treating discoloration due to fluorosis.¹²⁻¹⁸ This case report will discuss the management of fluorosis cases in anterior maxillary teeth using simple microabrasion techniques.

CASE REPORT

A 20-year-old female came to RSGM FKG Unpad with a complaint about white and brown spots on her teeth that interfere with her smile. The patient also complained of several brittle teeth and many cavities. She felt pain when eating and drinking. Never felt spontaneous pain. Based on the

anamnesis, it was found that the patient brushed her teeth twice a day while bathing. The patient admitted that when she was young, she liked to eat toothpaste. The patient wants to be treated for these complaints to improve her smile.



Figure 1. The clinical features of the anterior teeth

Extraoral examination revealed an asymmetrical face, absence of swelling in the left and right submandibular lymph nodes, which were not palpable and asymptomatic. On intraoral examination, teeth 13,12,11,21,22 and 23 had brown and white spots with porosity (Fig 1). On teeth 12 and 22, there were previous composite restorations. Teeth 36 had caries on the occlusal surfaces, and teeth 27 had amalgam restorations. Each of the anterior teeth was critical. The tissue did not conform to normal parameters. In general, the patient's oral hygiene is acceptable. Fluorosis with a score of 2 was diagnosed in teeth 11 and 21 in this case.

On the first visit, examination and the clinical photo (**Figure 1**) were taken, also a caries risk

examination then a diagnosis and treatment plan was determined. The patient was given information about the condition of her teeth, treatment procedures and complications that may occur, and costs and time required. The patient signed an informed consent after agreeing to the treatment plan. The first treatment was scaling and polishing the enamel surface using pumice paste. The patient was instructed to use Casein Phosphopeptide Amorphous Calcium Phosphate (CPP-ACP) and informed how to use it after meals and before bedtime for $\pm$ 7 minutes smeared on the surface of her teeth. On the second visit, a CPP-ACP use was controlled, and then microabrasion treatment carried out using 6% hydrochloric acid (HCL) (opalustre, ultradent) (**Figure 2**).



Figure 2. Opalustre Kit

Before the microabrasion procedure, the anterior maxillary teeth were pushed. Application Rubber dams on teeth 13-23 as isolation and protection of

soft tissue from microabrasion materials and ensure that no part of the rubber dam is leaking to prevent irritation of the gingiva and soft tissue (**Figure 3**).



Figure 3. The tooth surface before the microabrasion procedure

The tooth surface was prepared using a fine-tapered diamond bur to roughen the surface and create porosity. The microabrasion material could easily penetrate, thereby reducing the time required during the microabrasion procedure. Next, apply opalustre to the brown and white patches on the surface of teeth 12-22. The microabrasion material was flattened to the tooth surface using Opal Cup Bristle, with a circular motion on the surface of each tooth a low speed was used with a low-speed handpiece and three rotations for 60 s and water sprayed between application intervals (**Figure 4**).

Furthermore, fluoride gel with a neutral pH was applied to the tooth surface and left for 4 minutes. The fluoride paste polishing was smoothed over the entire tooth surface using the opal cup finishing at low speed. After all, procedures were completed, the rubber dam was removed, and the patient was instructed not to eat or drink for 30 minutes. The results of microabrasion showed changes in the enamel surface with the loss of brown and white spots (**Figure 5**).



Figure 4. Application of opalustre to the tooth surface (6% hydrochloric acid) using opal cup bristle

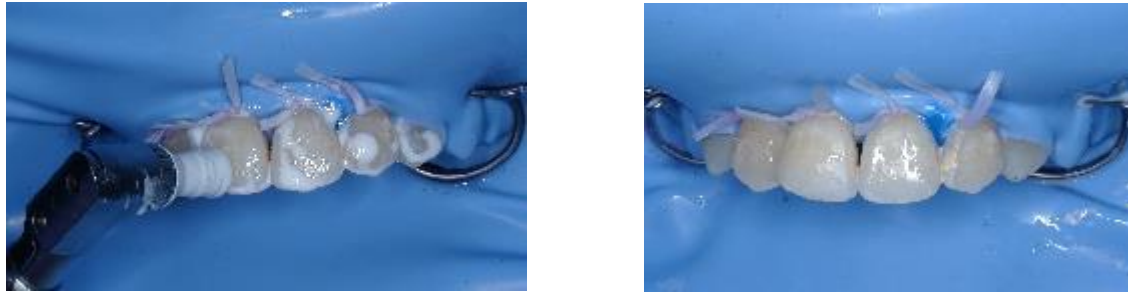


Figure 5. (Left) Fluoride paste application to the tooth surface and (Right) after microabrasion procedure

At the third visit, control was carried out after microabrasion treatment and repaired old composite

restorations on teeth 12 and 22 and restorations caries on teeth 11 and 21 (**Figure 6**).



Figure 6. Composite restorations on teeth 11 and 21

The patient came back two months later for control after microabrasion treatment and restoration of the maxillary anterior teeth. There was no patient complaint, percussion and palpation showed negative results, and surrounding tissue

was seen as normal. Re-polishing was performed on teeth 12 and 22 using a compressed eve polishing bur. The patient's final outcome showed improvement in her smile (**Figure 7**).



Figure 7. (Left) before treatment (Right) after microabrasion and composite resin restoration.

DISCUSSION

Fluorosis causes discoloration of the tooth surface and aesthetic problems. This condition can be the beginning of physiological problems in patients, especially in young patients. Based on the history of this case, it was found that the patient's habit as a child, sucking on toothpaste, was the cause of fluorosis. According to Fejerskov et al., fluorosis is caused by excessive fluoride intake

during the enamel formation, the age between 0-5 years, resulting in hypermineralized enamel with varying porosity levels.^{2,6,7}

The Microabrasion treatment technique is an appropriate technique for handling aesthetic cases due to fluorosis. This technique was chosen because it does not cause much loss of email structure. In general, the process is straightforward

in a short time and can be done in one visit and at a low cost to get maximum results. Another advantage of using microabrasion treatment, in this case, is that there are no post-procedure complications such as sensitivity or pulp tissue damage.¹²⁻¹³

This technique can remove brown stains and visible opacity on the teeth due to excessive fluoride intake.⁹⁻¹⁸ In this case, the patient admitted that brown color and white patches had been seen for a long time and were very annoying when smiling. This case combined microabrasion techniques with composite resin restorations to improve aesthetics because previous restorations proximal to the anterior teeth and cavities formed by hypermineralization. According to the results of research by Leonardo, et al. concluded that the combination of microabrasion and composite resin is a safe and conservative method to eliminate discoloration and improve tooth esthetics.¹²⁻¹⁶

The use of rubber dam as isolation and protector of the soft tissue from microabrasion and obtains the best visibility to speed up work procedures. The microabrasion material used was 6% hydrochloric acid (opalustre, ultradent). The choice of microabrasion material was based on the results of research conducted by Croll and Sundenfeld, which showed that 6% hydrochloric

acid had a minimal toxic effect compared to other micro-abrasives.¹²⁻¹⁶

The use of fined-tapered diamond bur on the tooth surface as a micro-reduction in the opacity area aims to allow the microabrasion material to enter the tooth surface to reduce the time needed during the microabrasion process. The abrasive material for microabrasion, namely 6% hydrochloric acid, is used when there are white and brown spots on the superficial enamel. Fluorine gel having a neutral pH was applied to the tooth surface after microabrasion to promote remineralization.¹¹⁻¹⁴

The results of research conducted by Olin et al. Stated that microabrasion techniques could modify the optical characteristics of enamel which is called the "abrasion effect". This abrasion phenomenon in the enamel prism has resulted from the simultaneous process of acid abrasion and erosion that solidifies the mineral composition into the organic layer and replaces the enamel's outer surface, which consists of a prism-rich layer with a compacted prism-free layer. Microabrasion gives it a shiny, shiny, and glossy surface resulting from different reflections and refractions. The optical characteristics after microabrasion can disguise the staining of the remaining enamel. In this case, the white and brown spots disappear after microabrasion.¹⁵⁻¹⁸

CONCLUSION

Fluorosis is a growth and development disturbance of teeth caused by excessive fluoride intake. Fluorosis causes the enamel surface to look white and brownish. Microabrasion is the first choice for aesthetic treatment in fluorosis teeth because this technique is carried out

conservatively, minimizing processing time with good results and low prices.

It is necessary to control regularly every six months to see the results of microabrasion treatment and re-examination of caries risk in patients.

ACKNOWLEDGEMENT

Thanks to the Conservative Department, Faculty of Dentistry, Universitas Padjadjaran Bandung, Indonesia.

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