Case Study

Conservative Approach to Treat Discolored Teeth

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Abstract

Introduction: In modern era, most of the patients are concerned about their aesthetics and at the same time they do not want to cut their teeth.

Aim: Present report explains conservative and more permanent treatment of discolored teeth.

Case Report: A 22-year-old boy, having moderate degree of fluorosis was treated as conservatively as possible. Combination of micro and macro-abrasion was employed. After that, composite veneering of required teeth was done. Patient was satisfied with the result outcome.

Conclusion: Microabrasion combined with macroabrasion and composite veneering is more permanent and aesthetic outcome as compared to microabrasion or macroabrasion alone or either of them followed by bleaching.

Keywords: Discolored teeth, Microabrasion, Macroabrasion, Composite veneering.

Introduction

One of the most frequent reasons patients seek dental care is discolored anterior teeth. Spots on teeth can result from a number of causes including accident, trauma, developmental abnormalities, braces, tooth decay, medications, smoking, and excessive fluoride content in water. Removing these stains can be difficult and teeth whitening or bleaching may not be effective. Treatment options include removal of surface stains, bleaching, microabrasion or macroabrasion, veneering, and placement of porcelain crowns.

There are increasing numbers of patients who do not want their teeth "cut down" for crowns and are electing an alternative, conservative approach, such as veneers, bleaching, microabrasion or macroabrasion that preserves as much of the natural tooth as possible.1

Most surface stains can be removed by routine prophylactic procedures. However, some superficial discolorations on tooth-colored restorations and decalcified areas on the teeth cannot be corrected by such cleaning. Conservative correction may be accomplished by mild micro and macroabrasion followed by bleaching to obtain an acceptable result. But bleaching is not a permanent solution for teeth whitening.1

So therefore, study was aimed to result in more aesthetic and more permanent outcome. In present case, combination therapy was used which include micro and macroabrasion followed by composite veneering.

Case Report

A 22-year-old young boy reported to the Department of Conservative Dentistry of our hospital with a chief complaint of discolored teeth (Fig. 1). The patient gave history of discoloration from his childhood. No relevant medical history was reported by the patient. On examination, moderate-grade fluorosis according to Dean’s Fluorosis index was present on maxillary anterior teeth (13-23) (Fig. 1). No dental caries were present in his oral cavity. His oral hygiene was not good. Treatment plan involved micro and macroabrasion followed by composite veneering.
Summary of Treatment Procedure

1. Pre-operative sensibility tests, radiographs and photographs were advised (Fig. 1).
2. Patient’s eyes were protected at every appointment by protective glasses from any splatter.
3. At first sitting, the defects were abraded by using a 12-fluted composite finishing bur in a high-speed handpiece and 30-fluted composite-finishing bur was used to remove any facets or striations created by the previous instruments. At the end of the appointment, re-mineralizing agent (GC tooth mousse) was applied over the treated area.
4. Patient was instructed to reapply GC tooth mousse himself twice daily after each appointment.
5. At the second sitting, macroabrasion procedure was repeated followed by application of GC tooth mousse (Fig. 3).
6. At the third sitting, microabrasion procedure was employed. The teeth to be treated were cleaned with pumice and water, washed and dried. The teeth were isolated with rubber dam and vaseline was applied to the gingiva prior to rubber dam application. Now a mixture of sodium bicarbonate and water was placed on the rubber dam behind the teeth to protect in case of spillage. Then, a small amount of whiteness RM (Fig. 2) was applied to the labial surface with a slowly rotating fluted rubber cup, a flat plastic instrument rubbed over the surface for 5 sec; washed for 5 sec directly into the aspirator. The procedure was continued until the defect was removed or until it was deemed imprudent to continue further. It was repeated until the stain was reduced, up to a maximum of 10×5 sec applications per tooth. GC tooth mousse was then applied on the teeth for 3 min followed by removal of the rubber dam.

1. Aesthetics of teeth other than 11 and 21, were satisfactory. So, composite veneering was only planned for more stained teeth 11 and 21.
2. At the fourth sitting, composite veneering was done on all previously macro and microabraded teeth. Finally the teeth were polished with graded Soflex discs (Super Snap, Shofu Inc.) and with a fluoride-containing prophy paste to restore surface luster (Fig. 4).
3. The patient was reviewed in one month for sensibility testing and photographs.
4. Review was again done in six months to check pulpal status. The patient was satisfied with final aesthetic outcome.
Discussion

Aesthetics is a subjective perception. Hence, in this study, no aesthetic index was used. Instead, the patient’s and their parent’s satisfaction of the improvement was regarded as a successful outcome.

One of the most common causes for dental visits is discolored anterior teeth. Discolorations are classified as extrinsic or intrinsic. Extrinsic stains are located on the outer surfaces of the teeth, whereas intrinsic stains are internal. External stains are removed by routine oral prophylaxis or mild microabrasion may be required. Intrinsic discolorations are caused by hereditary disorders, medications (particularly tetracycline preparations), excess fluoride, high fevers associated with early childhood illnesses, and other types of trauma. Additionally, localized areas of demineralization or the failure of the enamel to properly calcify can result in hypocalcified white spots. Many discolorations can be corrected or greatly improved through conservative methods such as bleaching, microabrasion or macroabrasion or veneering. Bleaching usually will result in tooth lightening for only 1 to 3 years, whereas an etched porcelain veneer should last 10 to 15 years or longer. Bleaching is not permanent whereas porcelain veneer requires more tooth cutting.

Microabrasion is a quick and painless solution for removing yellow, white, or brown spots, stains, and discolorations on the teeth. Microabrasion is an excellent method to remove intrinsic enamel stains of any etiology and color, as well as to correct superficial irregularities on the buccal aspect of enamel like moderate-grade fluorosis, post-orthodontic demineralization, localized hypoplasia due to infection or trauma, and idiopathic hypoplasia where the discoloration is limited to the outer enamel layer. These alterations, however, should have a hard texture and may affect the superficial layers of dental enamel. But it cannot be successfully employed for discoloration which is more diffuse in nature.

Because it is very difficult to determine the real depth of intrinsic stains or surface irregularities, the application of microabrasion technique on intrinsic stains, regardless of their dimensions and depths, should always be considered before trying a restorative procedure.

For the case presented in this article, taking all these considerations, a combination of macroabrasion and microabrasion, followed by composite veneering is planned.

In the present case, the patient had mild to moderate-grade fluorosis. Advantage of micro and macroabrasion is that it is a much faster procedure in achieving the desired result compared to other treatment options. However, the main disadvantage is that these procedures employ high-speed rotary instrument, which can lead to excessive removal of tooth structure if operator does not have the desired skill level.

Microabrasion involves the removal of a small amount of surface enamel and classically incorporates both “abrasion” with dental instruments and “erosion” with an acid mixture. The term “abrasion” has been used by some authors. There are two main techniques for microabrading discolored or hypoplastic teeth. This is the hydrochloric acid/pumice technique which requires very careful isolation of the affected teeth, and the phosphoric acid/pumice technique. In the present case, a slight microabrasion, using a microabrasive paste (Whiteness RM, FGM, Joinville, SC, Brazil) (Fig. 2) was fricitioned on the enamel with a spatula, on both the irregularities and the limits of the tooth defect. This procedure was repeated 10 times with each application for 5 sec to remove approximately 100 µm (0.1 mm) of surface layer.

Whiteness RM is microabrasive agent consisting of 6% hydrochloric acid and silicon carbide. Whiteness RM has been shown to achieve safe and excellent clinical results.

After application of microabrasive agents, enamel surfaces have been found to acquire a glasslike luster and exceptionally smooth texture due to dense prismless layer. The results of a previous study showed distinct evidence of enamel surface changes that have been described as the abrasion effect.

However, advantages and disadvantages exist with each. Microabrasion has the advantage of ensuring better control of the removal of tooth structure. High-speed instrumentation as used in macroabrasion is technique-sensitive and can have catastrophic results if the clinician fails to use extreme caution. Surface enamel alterations that result from microabrasion, such as roughness and microhardness, are easily restored by saliva. Clinical studies support the efficacy and longevity of this safe and minimally invasive treatment.

However, macroabrasion is considerably faster and does not require the use of a rubber dam or special instrumentation. Defect removal is also easier with macroabrasion compared with microabrasion if an air-water spray is used during treatment to maintain hydration of the teeth. Nonetheless, microabrasion is
recommended over macroabrasion for the treatment of superficial defects because of better operator-control and superior patient-acceptance. To accelerate the process, a combination of macroabrasion and microabrasion may also be considered. Gross removal of the defect is accomplished with macroabrasion, followed by final treatment with microabrasion.

Little knowledge exists about remineralization after microabrasion; however, a previous report showed that teeth treated with 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.\textsuperscript{10}

GC tooth mousse is used postoperatively in the present study as a preventive measure. The principal ingredient is Recaldent CPP-ACP (casein phosphopeptide-morphous calcium phosphate), enabling GC tooth mousse to bind to biofilm, plaque, bacteria, hydroxyapatite and surrounding soft tissue, localizing bio-available calcium and phosphate, according to the company. It is available in five delicious flavors: strawberry, melon, vanilla, mint and tutti frutti.\textsuperscript{11}

The association of microabrasion technique in conjunction with supervised home bleaching is presented as an excellent therapeutic option.\textsuperscript{12,13} The combination of techniques is efficient and can be recommended as a suitable alternative to the conservative treatment of teeth affected by severe staining but the effect of bleaching lasts for only 1 to 3 years.\textsuperscript{5} So more permanent and conservative approach is employed to achieve a satisfactory aesthetic outcome. Composite veneering is preferred over bleaching and porcelain veneering.

Veneers have been successfully employed for management of moderate-grade fluorosis.\textsuperscript{14} Because of the time constraint given by the patient, direct composite veneer treatment option was selected. Advantage of direct composite veneer is that it is done with minimal chair time when compared to indirect ceramic veneers, disadvantage being its long term wear-resistance and color stability.\textsuperscript{6} Composite veneering was preferred over bleaching and porcelain veneering in the present case.

**Conclusion**

It has been reported from findings that the predominant cariostatic effect of fluoride is not due to its uptake by the enamel during tooth development but during cyclic de- and re-mineralization processes, which take place at the tooth/oral fluid interface, so it is possible to achieve caries reduction without concomitant risk of dental fluorosis.\textsuperscript{11} So it is in the interest of both patient and dentist that the dentist be aware of all the treatment modalities available to him. Newer treatment options available are laser-assisted bleaching, abrasion employing abrasive pastes.\textsuperscript{15,16} This article advocates conservative as well as more lasting treatment option over other approaches but severity of the lesion as well as expectation of patients should determine the treatment option.

**Conflict of Interest:** None

**References**


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