Microabrasion and bleaching for dental fluorosis

BACKGROUND

Dental fluorosis causes patients to have enamel that has a low mineral content and increased porosity compared to unaffected teeth. This developmental disturbance is caused by systemic exposure to high fluoride concentrations during tooth development. Although more invasive methods of treatment have been selected in the past, minimal intervention dentistry has led to the selection of microabrasion and bleaching as first options. These are especially favored for younger patients, who are usually the ones coming for treatment of dental fluorosis. The results achieved by a patient with dental fluorosis who underwent microabrasion and tooth whitening were reported.

CASE REPORT

Woman, 24, expressed her dissatisfaction with the appearance of her front teeth, which were chalky white and brown and highly visible in her smile. She had grown up drinking well water, which she believed containing excessive naturally occurring fluoride levels.

Esthetic analysis revealed a high smile line, appropriate axial inclination of the maxillary anterior teeth, and a healthy thin periodontal biotype with scalloped gingival tissue and long interdental papillae. The patient's class I molar occlusal relationship bilaterally with anterior open occlusal relationship contributed to the retention of enamel mamelons on all maxillary incisors. The patient had excellent oral hygiene, no restorative treatments, and both uniform periodontal ligament space and intact laminae dura of her anterior teeth. She was diagnosed with dental fluorosis with a Tooth Surface Index of Fluorosis (TSIF) score of 4 (Figure 2).

The patient's treatment plan included enamel microabrasion using 6.6% hydrochloric acid slurry to be followed by at-home whitening with a 10% carbamide peroxide gel. The whitening product was to be delivered using a custom-fitted tray overnight for 2 to 3 weeks, with the goal of reducing any color contrast that remained.

At the initial treatment visit, a well-sealed rubber dam was applied, which is critical to protect against the caustic and toxic effects of hydrochloric acid. Floss ligatures were applied to all anterior teeth to ensure proper inversion. The slurry mixture was placed on the anterior teeth's facial aspect, then special polishing cups were applied. These cups held bristles that rotated slowly while gentle pressure was applied for 1 minute to distribute the mixture evenly (Figure 4). This approach ensured a uniform removal of the superficial enamel layer. After each application, intermittent water rinsing and inspection were performed to determine if more applications were needed. This patient required 3 applications, then fluoride varnish was applied.

One week later, irreversible hydrocolloid impressions were obtained and poured to fabricate bleaching trays. The patient was provided with the tray and the bleaching gel, which was to be used overnight for 14 to 21 days. Photographs were taken after 1 and 2 weeks (Figure 7). Minor hypocalcified white spots remained, but the patient was very satisfied with the final result, which was judged to have a TSIF score of 1. Eight months after treatment, the patient remained happy with the outcome.

Figure 2. Chalky, opaque white spots and brown spots led to diagnosis of dental fluorosis with TSIF of 4. *TSIF,* Tooth Surface Index of Fluorosis. (Courtesy of Romero MF, Babb CS, Delash J, et al: Minimally invasive esthetic improvement in a patient with dental fluorosis by using microabrasion and bleaching: A clinical report. *J Prosthet Dent* 120:323-326, 2018.)

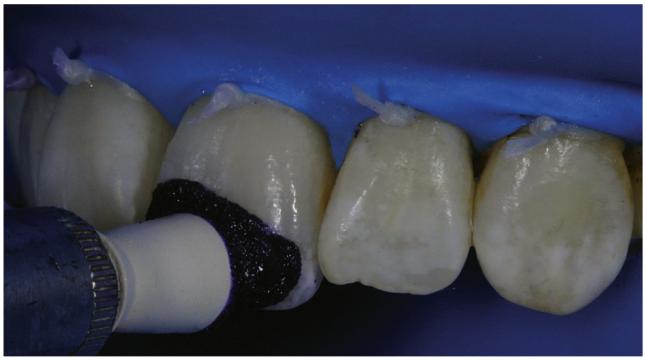

Figure 4. Application of hydrochloric acid slurry mixture according to manufacturer instructions. (Courtesy of Romero MF, Babb CS, Delash J, et al: Minimally invasive esthetic improvement in a patient with dental fluorosis by using microabrasion and bleaching: A clinical report. *J Prosthet Dent* 120:323-326, 2018.)

Figure 7. After 1 week of tooth whitening. (Courtesy of Romero MF, Babb CS, Delash J, et al: Minimally invasive esthetic improvement in a patient with dental fluorosis by using microabrasion and bleaching: A clinical report. *J Prosthet Dent* 120:323-326, 2018.)

Clinical Significance

Dental fluorosis can produce an unesthetic coloration of the dental enamel and results from exposures to excessive fluoride during enamel formation. Because patients who want to improve the appearance of their teeth affected by fluorosis tend to be young, minimal intervention approaches are especially appropriate. Microabrasion and bleaching offer these patients an effective way to achieve better-appearing teeth and a more attractive smile while maintaining tooth structure and costing much less than restorative dental procedures.

DISCUSSION

Microabrasion is an appropriate option for improving the appearance of teeth that are marred by dental fluorosis. Enamel loss with this technique is 25 to 200 μm, which is acceptable for clinical use. The result of the microabrasion is a prism-free enamel surface that reflects and refracts light to obtain a smooth, regular, and lustrous appearance that actually improves with time. The bleaching enhances the results of the microabrasion and can reduce the contrast between any remnants of white spot lesions or yellow appearance of the teeth.

Romero MF, Babb CS, Delash J, et al: Minimally invasive esthetic improvement in a patient with dental fluorosis by using microabrasion and bleaching: A clinical report. *J Prosthet Dent* 120:323-326, 2018

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Ceramic veneers for severe dental fluorosis

BACKGROUND

Dental fluorosis is caused by the chronic ingestion of fluoride during tooth development. It manifests as outer hypermineralization and subsurface hypomineralization. Although water fluoridation is both safe and effective as a public health measure to reduce dental caries, excessive fluoride in drinking water, that exceeding a concentration of 0.5 to 1.5 mg/L, can alter the metabolism of ameloblasts, which causes a defective matrix and improper calcification. When it affects the anterior teeth, dental fluorosis becomes a cosmetic concern. Selection of the proper method of addressing dental fluorosis is based on the severity of the problem and ranges from bleaching and microabrasion for mild cases to ceramic veneers for severe ones. A case report detailing the esthetic rehabilitation of a patient with severe fluorosis using ceramic veneers was offered.

CASE REPORT

Man, 26, of Yemen, was referred for treatment of his unattractive smile caused by generalized tooth discoloration. Clinical examination revealed generalized fluorosis and loss of the outermost layer of enamel in irregular areas that involved less than half of the entire tooth surfaces. Changes in morphology cause by pits and marked attrition were also noted (Figure 1, **B**). The dental fluorosis was classified according to the Thylstrup and Fejerskov index (TFI) as TFI 7.

Figure 1. Preoperative clinical photograph. **B,** Frontal view. (Courtesy of El Mourad AM: Aesthetic rehabilitation of a severe dental fluorosis case with ceramic veneers: A step-by-step guide. *Case Reports Dent,* Vol 2018 Article ID 4063165.)