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Dentistry Section

Microabrasion as an Effective Treatment for Severe Dental Fluorosis: Images in Medicine

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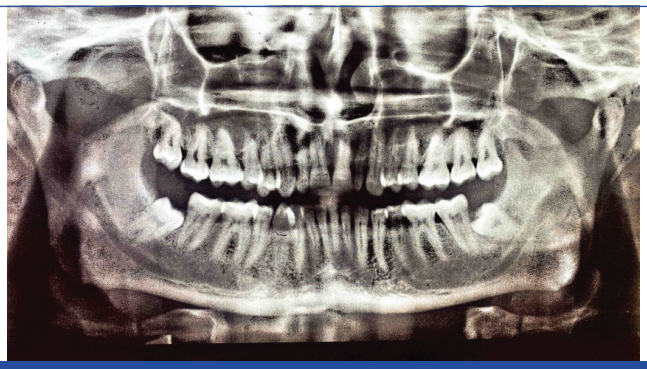
A 28-year-old male presented to the dental clinic with white and brown discolourations, as well as hard, pitted areas on the enamel [Table/Fig-1,2], seeking aesthetic treatment. After obtaining a detailed medical history and performing a clinical examination, including electrical pulp testing and cold testing, a radiographic evaluation was conducted. The radiographs revealed no periapical lesions or caries, and no signs of resorption were observed in the teeth of interest. All the associated teeth were vital, with a healthy periodontium. The patient was diagnosed with severe enamel fluorosis, classified as grade 4 according to the Dean's Index [1].

[Table/Fig-1]: Pre-operative clinical images.



[Table/Fig-2]: Pre-operative radiographic images.

Treatment options, including veneers, crowns, and macroabrasion, were discussed with the patient and his parents. Ultimately, the enamel microabrasion technique was selected to address the stains and pitted areas on the facial surfaces of the upper incisors, canines, and premolars.

After obtaining informed consent for both the treatment and the publication of identifiable images, petroleum jelly was applied to protect the gingival tissues. The operative field was isolated using a rubber dam to shield the gums from the microabrasive compound. All individuals involved in the procedure, including the patient, assistants, and operator, wore appropriate personal protective equipment and eye protection throughout the treatment.

For the enamel microabrasion procedure, 6.6% hydrochloric acid was freshly prepared in the biochemistry laboratory. The acid was applied using a rubber cup attached to a low-speed handpiece, with firm pressure applied to remove the stains. Pumice was selected as the abrasive for this case. The compound was applied three times, with each application lasting one minute for six teeth- approximately 10s per tooth- followed by water rinsing between each session. Afterward, the abraded enamel surface was polished with a fluoridated paste, and a neutral 2% sodium fluoride gel was applied for four minutes. [Table/Fig-3] shows the post-treatment appearance of the enamel following the microabrasion procedure.

[Table/Fig-3]: Postoperative clinical images post-microabrasion.

One month later, dental bleaching was performed using 35% hydrogen peroxide (SDI Pola Office Bleaching Material) with the aid of an Optradam. A single 20-minute cycle was performed. To prevent reversal of the process, a polishing kit was used in sequence. Immediate postoperative images are shown in [Table/Fig-4,5].

[Table/Fig-4]: Postoperative clinical image under rubber dam after bleaching.

[Table/Fig-5]: Postoperative clinical images post bleaching.

Telephonic follow-up was conducted for three days. The patient reported mild sensitivity only on the day of the procedure, immediately following the treatment, which resolved within four hours. No other side-effects or complications were reported during or after the treatment. Three months later, the patient was recalled for a follow-up visit. During this visit, the pits were restored with composite (Dentsply Spectrum Composite, Shade A1). The follow-up image is shown in [Table/Fig-6]. [Table/Fig-7] presents a comparison of the pre-operative and postoperative images.

[Table/Fig-6]: Follow-up clinical images after composite restoration of the pits.

[Table/Fig-7]: Pre-operative and postoperative clinical images.

The results showed a significant improvement in colour, with the shade lightening from A2 to A1. According to the Dean's Modified Index, the postoperative image indicated a very mild result, corresponding to grade 1 [2].

The microabrasion process, which involves acidic agents and abrasive compounds, helps reduce the whitish appearance of lesions by removing the outer dysplastic enamel layer. A study by Lu Y et al., divided participants into two groups for office bleaching, one of which combined microabrasion using 37% phosphoric acid. The results revealed a significant difference, with the microabrasion group showing better outcomes [3]. Similarly, Divyameena B et al., achieved comparable results using Opalustre for microabrasion and observed no postoperative sensitivity [4]. However, according to a systematic review, microabrasion is considered effective for mild to moderate cases but shows less promising results for more severe cases [5].

A newer treatment modality that has gained acceptance is resin infiltration. In a study by Reddy VN et al., where 37% phosphoric acid with pumice, Opalustre, and resin infiltration were compared, it was concluded that the mean surface roughness was 10.42 for the combination, while resin infiltration had a surface roughness of only 1.99. This suggests that resin infiltration is a less invasive method with reduced post-operative reversal of results [6].

This case demonstrates that microabrasion is an effective and conservative treatment option for severe dental fluorosis, offering substantial aesthetic improvements without the need for invasive procedures. By selectively removing discoloured and hypomineralised enamel layers, microabrasion enhanced the patient's smile, resulting in a more uniform and natural appearance of the teeth.

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