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Achieving Radiant Smile: A Case Report on In-Office Vital Teeth Bleaching

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Abstract –
Background *-Vital tooth bleaching, a prevalent cosmetic dental procedure, significantly enhances smile aesthetics with minimal invasiveness. This technique effectively lightens natural tooth shade, boosting patient confidence without compromising tooth structure, unlike invasive alternatives such as veneers or crowns. Tailored by dental professionals, bleaching processes adjust bleaching agent concentrations to optimize results while mitigating sensitivity risks. Supervised by qualified practitioners, safety is ensured, contributing to long-lasting whitening effects, particularly with appropriate post-treatment care. Both in-office treatments and take-home kits provide convenient options for patients, enhancing accessibility. Vital tooth bleaching emerges as a cost effective solution for patients seeking a brighter smile, encompassing aesthetic enhancement, customization, safety, durability, convenience, and affordability.*

KEYWORD – *Microabrasion, Bleaching, Vital tooth.*

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I. Introduction

For centuries, a bright smile has symbolized beauty, health, and vitality. Discoloration, particularly in the front teeth, significantly impacts aesthetics and can lower self-esteem. In recent years, there has been a notable increase in the demand for aesthetic dentistry, particularly tooth whitening. Compared to restorative methods, whitening, or bleaching, is the most conservative approach for addressing tooth discoloration. This surge in demand reflects the desire for a whiter smile and improved aesthetics, making tooth whitening a popular and frequently requested dental procedure. Additionally, tooth whitening often complements other aesthetic treatments, encouraging further enhancement. Dental bleaching provides a conservative, cost-effective means of altering tooth color, with techniques including in-office procedures, at-home applications, or a combination of both.[1]

Dental fluorosis is a condition caused by prolonged exposure to fluoride, disrupting enamel growth and resulting in hypomineralization. This disorder affects tooth development and presents aesthetic concerns such as white spots, brown stains, or opaque lines on the tooth surface. While fluorosis is evenly distributed across teeth, its severity differs depending on the tooth type.[2]

Treatment options for dental fluorosis include microabrasion, bleaching, composite restoration, veneers, or full crowns, chosen based on individual cases. Enamel microabrasion is recommended for mild to moderate fluorosis stains, while moderate to severe cases may require a combination of microabrasion and bleaching. Severe fluorosis with significant enamel flaws may necessitate restorative procedures.[3]

Bleaching procedures come in two main types: non-vital for root canal-treated teeth and vital for those with live nerves. Vital bleaching involves applying a gel-like whitening solution, such as hydrogen peroxide, sodium perborate, or carbamide peroxide, directly onto the tooth surface, followed by heat activation.[4]

Oxidation of pigments is key to tooth bleaching, achievable through either carbamide peroxide or hydrogen peroxide. This in-office procedure, often termed "one-hour bleaching," employs high concentrations of hydrogen peroxide, typically ranging from 25% to 35%. Treatment duration can be as short as 1 to 1.5 hours in a single visit or through multiple sessions, tailored to individual patient needs.[5]

Most practitioners agree that some type of mechanical cutting or abrading the thin residual resin layer is usually appropriate, with great care used so as not to nick, abrade, or gouge the enamel. Mechanical resin

removal, regardless of how careful the resin is cut, usually results in some superficial enamel damage. Enamel microabrasion, analogous to dermabrasion on skin surfaces, was developed to improve surface texture, remove superficial intrinsic tooth stains, and to repair enamel decalcification and texture defects.[6,7,8]

Using enamel microabrasion compounds, enamel surfaces become smooth and lustrous and maintain a glasslike sheen as years pass after treatment. When there is a proper case selection and when the enamel microabrasion is completed conservatively, enamel loss is clinically insignificant and unrecognizable. The use of chemical agents to remove superficial enamel stains is quite effective, and the treatment results are permanent.[9] This report describes tooth color improvement achieved in patients using enamel microabrasion followed by dental bleaching.

II. Case Report

A 23-year-old male patient presented to the Department of Conservative Dentistry and Endodontics at Chhatrapati Shahu Maharaj Shikshan Sanstha Dental College and Hospital, Chhatrapati sambhajinagar, with concerns regarding the discoloration of his upper and lower teeth. Upon examination, no significant signs or symptoms were noted, and the patient's medical history was unremarkable. Clinical assessment revealed the presence of dark brown stains on the facial surfaces of the maxillary central and lateral incisors. These stains were classified as moderate to severe fluorosis based on Dean's fluorosis index.

Our goal was to enhance the patient's smile while prioritizing minimally invasive procedures, efficient treatment duration, and consideration of the patient's financial constraints. Consequently, we opted for microabrasion as the ultimate treatment choice. Initially, oral prophylaxis was conducted.

After cleaning the teeth with dental prophylaxis paste, a fine-tapered diamond bur was used to remove the resin remnants (Figure 1B). The bur was also used to slightly abrade the white enamel defects on facial surfaces , microabrasion compound was compressed upon the enamel surfaces using a rubber cup with enclosed brush bristles, specifically developed for this purpose. The cup was mounted on a slow speed, 10:1 gear reduction handpiece. Therefore, the compound was applied with high torque, but very slow speed, to prevent splattering. The teeth were rinsed with water/air spray after each application. The teeth were then dried with the air syringe and polished with fluoridated prophylaxis paste.

- Determine the pre-op shade for comparison.
- Clean teeth with prophylaxis paste.

- Insert cheek retractors and apply petroleum jelly to lips.

Gingival Protection:
- Dry teeth and apply Gingiva Shield slightly overlapping enamel and interproximal areas.
- Light cure for 20–30 seconds using a fanning motion.

Mixing the Gel:
- Open the powder pot and empty the liquid activator into it.
- Mix thoroughly using a brush to form a homogeneous gel.

Application:
- Apply a thick layer of the gel to all teeth being treated.
- Leave gel on for 10 minutes.
- Suction off and repeat 2–3 times using fresh gel. Use the mixed gel within 30–40 minutes.

Post-Treatment:

- After the final application, suction off the gel, rinse, and remove the gingival barrier starting from one end.
- Compare post-operative shade, shade changes from C2 TO B2 determined using shade guide and advise post-care. Maintenance included two weeks use of an over-the-counter whitening toothpaste, with post-operative instructions given. No sensitivity or stain relapse occurred in the six-month follow-up.

Fig 1 Preoperative photographs a) Application of prophylaxis paste using rubber cup. B) Application of fine tapered diamond bur .

Fig 2 a) after enamel microabrasion b) shade matching using shade guide c) application of gingival barrier d) mixing of powder and liquid .

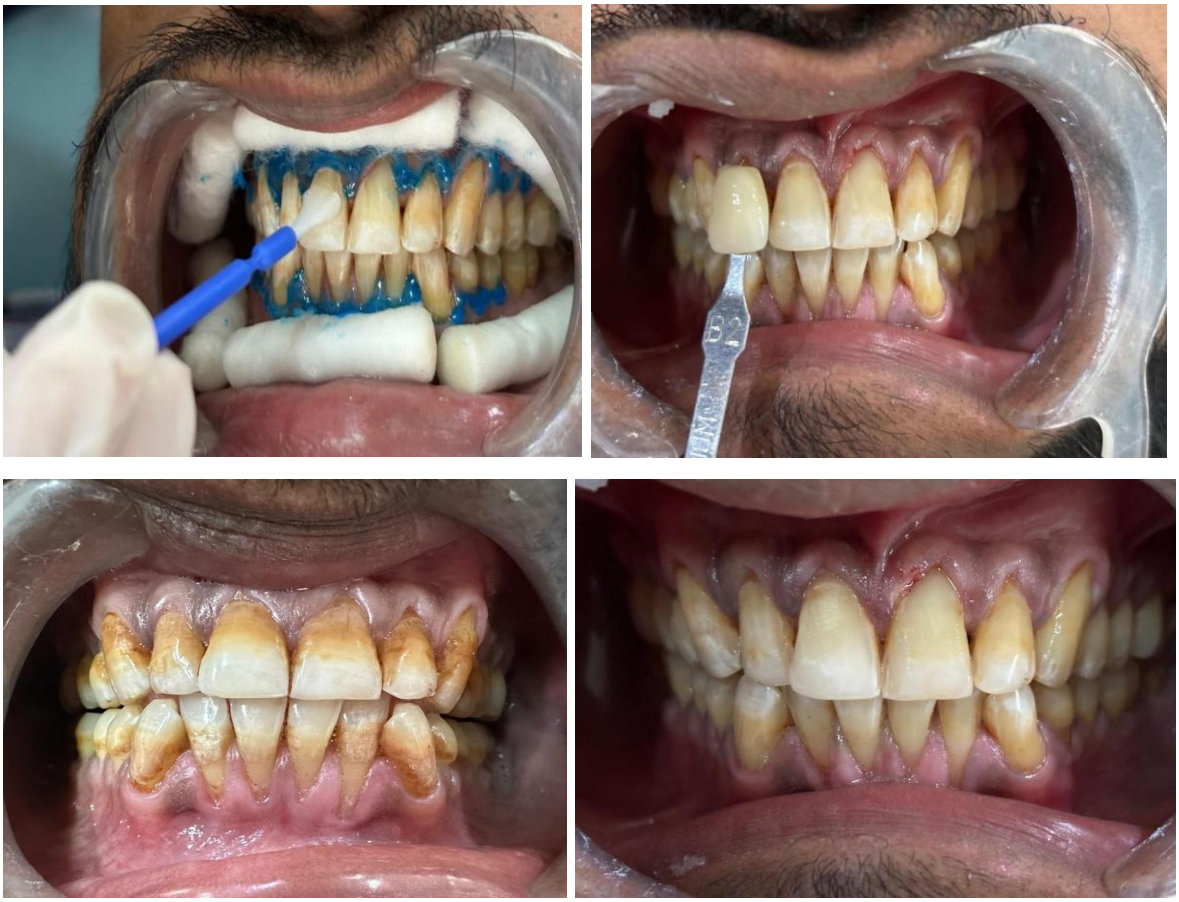

Fig 3 **a) Application of bleaching gel using applicator tip b) final shade matching using shade guide .c&d) pre and post operative photographs**.

III. DISCUSSION:

Bleaching is characterized as the process of diminishing the color intensity of a tooth by employing a chemical agent to induce oxidation of the organic pigments present within the tooth structure. The primary aim of a bleaching procedure is to reinstate the natural color of the tooth by eliminating discoloration through the utilization of a potent oxidizing substance referred to as a bleaching agent.[10]

The bleaching procedure is applicable to various conditions causing tooth discoloration, including pulp tissue decomposition, internal hemorrhage, trauma, medication-induced discoloration, and systemic conditions like fluorosis, jaundice, and fetal erythroblastosis. However, there are key contraindications, such as avoiding bleaching in pregnant women, infants, and children under 10 years old, as well as patients with exposed dentinal tubules or those unable to abstain from smoking during treatment. Irrespective of the specific bleaching technique or product used, the mechanism of action relies on the release of active oxygen species through the interaction of hydrogen peroxide with tooth structure. Hydrogen peroxide acts as an oxidizing agent, generating free radicals and releasing oxygen. This process breaks down pigment molecules, particularly those absorbing the blue spectrum of light, into smaller, less pigmented compounds with free hydroxyl groups. Consequently, the reflected light comprises a mixture of blue, green, and red spectra, resulting in a whitening effect on the teeth.

Enamel microabrasion is considered effective for addressing external enamel stains, including those presenting as white, yellow, or brown discolorations. When managing fluorosis, it is imperative to accurately assess the severity of enamel staining. Utilizi ng acidic and/or abrasive substances during enamel microabrasion yields immediate and enduring improvements in aesthetics while minimizing enamel loss and post-operative discomfort. Successful outcomes hinge upon meticulous patient selection and proficient rubber dam isolation. In a study conducted by Sundfeld et al., a microabrasive product was incorporated to enhance stain removal and refine the enamel surface. This product comprises 10% hydrochloric acid and silica carbide particles. Preceding applicati on of a fine-tapered diamond bur facilitated the subsequent two to three applications of the microabrasive product, typically necessary for achieving desired aesthetic results. Vital tooth bleaching, or teeth whitening, is a non-invasive cosmetic dental procedure with several benefits. It effectively lightens natural tooth shade, enhancing smile aesthetics and bolstering confidence. Unlike invasive options such as veneers or crowns,

it preserves tooth structure, appealing to those seeking cosmetic enhancements without significant dental alterations. Customizable by professionals, it allows tailored adjustments of bleaching agents to achieve desired results while minimizing sensitivity. Supervised application ensures safety and enduring whitening effects, particularly with proper maintenance. Vital tooth bleaching offers convenience through in-office treatments or take-home kits, accommodating diverse patient preferences.

Additionally, its affordability broadens accessibility, making it a popular choice for achieving a brighter smile, encompassing aesthetic improvement, customization, safety, longevity, convenience, and cost-effectiveness.[11,12,13]

IV. CONCLUSION:

Vital tooth bleaching employing prevest offers a promising therapeutic avenue for individuals pursuing efficacious and safe dental whitening interventions. Through methodical implementation and capitalization on prevest advantages, dental professionals can attain exemplary aesthetic results while upholding patient comfort and preserving dental vitality.

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