



## Case Series

## Combination bleaching technique for an aesthetic upgrade in vital teeth- A case report of two cases

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## ABSTRACT

Teeth stains can broadly be classified into two types; Extrinsic and Intrinsic stains, the latter being harder to remove. The etiology of discolouration is vast which could be due to diet, medication, fluorosis or any systemic illness. Extrinsic stains are mainly on the outer surface of the tooth (Ex: Tea stains, Tobacco stains) and Intrinsic stains are present mainly within the tooth structure (Ex: systemic stains, fluorosis). Tooth bleaching is a cosmetic dental procedure aimed at improving the aesthetics of the smile and thereby increasing the patient satisfaction. This case report documents the successful application of a combination therapy for vital tooth bleaching by using walk in bleach as well as laser bleaching for the patients aesthetic considerations

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### 1. Introduction

Tooth discoloration is a common dental issue that affects the appearance of a person's smile, often leading to self-consciousness and reduced confidence. Discoloration can occur due to various reasons, including intrinsic factors such as aging, genetic predisposition and developmental disorders or extrinsic factors like the consumption of staining substances (e.g., coffee, tea, red wine), smoking and certain medications. The discoloration may present as yellow, brown, or gray shades on the teeth, depending on the underlying cause.

To address this issue, various tooth bleaching techniques have been developed, ranging from In-office professional treatments to at-home whitening kits. In-office bleaching involves the use of highly concentrated hydrogen peroxide or carbamide peroxide gels, activated by light or heat, providing immediate and noticeable results. At-home options include custom-made trays with lower

concentrations of bleaching agents, whitening strips, and over-the-counter products like toothpaste and gels. Each technique has its benefits and limitations and it is the job of the dentist in determining the most suitable approach. This case report presents the successful application of in-office vital tooth bleaching along with laser application of bleaching in the patient seeking aesthetic upgrade.

An alternative to more invasive methods like crowns, composite veneers, and ceramic veneers is bleaching.<sup>1</sup>

### 2. Case Presentation

#### 2.1. Case 1

A 28 year old Male patient reported to the Department of Conservative Dentistry and Endodontics, school of Dental Sciences with a chief complaint of yellowish discoloration of the teeth. Clinically, the surrounding soft tissue was normal. Periodontal probing showed normal sulcular attachment and depth. The teeth were vital on examination and a diagnosis of mild intrinsic stains was

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made.

Vital bleaching with hydrogen peroxide using 35% hydrogen peroxide was planned. The application of a protective barrier to the gums was done and the gingival barrier polymerized. Pola Office whitening gel, containing 35% hydrogen peroxide, was then applied to the teeth using an applicator tip. The gel was activated with the LED light source and left for 7 minutes. (Figure 1a,b,c) The gel was then removed, and the process was then repeated one more time in exactly same manner. Afterwards, the gums were cleaned.

The tooth surface was then cleaned and then the laser assisted bleaching was initiated in the similar manner. The base and activator were thoroughly mixed and then activated by BIOLASE epic, where the settings were opted for whitening/bleaching. The laser handpiece pen head was attached and was then held near the tooth surface giving coverage to about 3 teeth at one time. (Figure 1d,e) 2 cycles of 30 second each were repeated for each set of teeth.<sup>2</sup> After bleaching, desensitizing agent was applied and then post operative instructions were given. The patient was recalled after a week for a shade analysis and to assess the post operative sensitivity. On Follow up, the patient had very minimal sensitivity and the overall shade received was B1. (Figure 1f)

## 2.2. Case 2

A 27 year old Male patient reported to the Department of Conservative Dentistry and Endodontics, school of Dental Sciences with staining on teeth. The medical history from the patient was non-contributory. Clinically, the upper anteriors seemed to be moderately fluorosed. The tooth was surrounded with normal soft tissue, which was rendered normal. And a suggestive diagnosis of mild intrinsic staining was made with a primary pre-operative shade of A3.

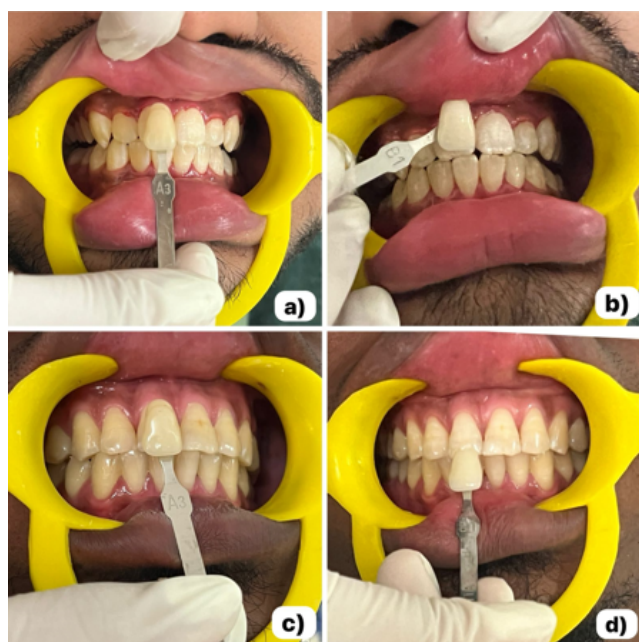
A conventional LED laser bleaching was initiated for a single cycle. The 35% hydrogen peroxide was applied to the teeth with an applicator tip and manually agitated. The LED laser activation was done for 7 minutes followed by the 45% LASER bleaching. The BIOLASE epic, laser was set to the whitening/bleaching mode, and the laser handpiece was positioned to cover approximately three teeth at a time. Each set of teeth underwent two 20-second cycles. Following the bleaching procedure, a desensitizing agent was applied, and the patient received post-operative instructions. A follow-up appointment was scheduled after one week to evaluate the shade change and any post-operative sensitivity. The follow up revealed reduced post operative sensitivity and a lighter tooth shade from A3 to B1. (Figure 2a-e)



**Figure 1:** Clinical procedure for combination Bleaching technique for Case 1; **a):** Matching of the shade pre operatively – A3; **b):** Placement of Gingival barrier and 35% hydrogen peroxide in office bleach; **c):** Activation of the bleaching agent with LED light source; **d):** Application of the Laser bleach system; **e):** Activation by BIOLASE, epic; **f):** Post Operative shade – B1



**Figure 2:** Clinical procedure for combination Bleaching technique for Case 2; **a):** Matching of the shade pre operatively – A3; **b):** Placement of Gingival barrier and 35% hydrogen peroxide in office bleach; **c):** Application of the Laser bleach system; **d):** Activation by BIOLASE, epic; **e):** Application of Desensitising paste; **f):** Post Operative shade – B1



**Figure 3:** Comparison of the pre operative v/s Final shade received after 1 week follow up; **a):** Pre operative shade at A3 for Case 2; **b):** Post operative shade at B1 for Case 2; **c):** Pre operative shade at A3 for Case 1; **d):** Post operative shade at B1 for Case 1

### 3. Discussion

The case selection for a combination bleach technique is an utmost important factor for the successful outcome of this technique. Patients with highly sensitive teeth, severe fluorosis, deep caries are contraindicated for bleaching. The conventional in office bleaching is a technique with long standing success but gives a post operative symptom of sensitivity. Bleaching can exacerbate dentinal hypersensitivity because the bleaching agents, typically hydrogen peroxide or carbamide peroxide, penetrate the enamel and reach the dentin layer of the teeth. The dentin contains tiny tubules that lead to the tooth's nerve. To overcome this challenge, the diode laser technique was used in combination with the conventional in-office bleaching technique which yielded synergistically better results.<sup>3</sup>

LASER assisted tooth bleaching has gained importance over the years as an optimal technique for whitening the teeth with minimal side effects. The case studies presented the application of a diode laser in conjunction with a high concentration peroxide gel to explore the efficacy and safety of this approach in enhancing the dental esthetics.<sup>2,4</sup> Diode lasers are commonly the choice of lasers for tooth bleaching as the wavelength compatibility lies in the range of 810-980 nm, this particular wavelength is well-absorbed by chromophores in the dental tissue. The absorption characteristics of diode lasers allow for selective targeting of pigmented sections while minimizing the damage to the surrounding structures. This is also known as bleach

mapping.<sup>5</sup>

Laser bleaching is often considered superior to traditional in-office bleaching because it provides faster results, often in a single session, by using a laser to activate the bleaching agent and speed up the whitening process. This method can achieve a brighter, more uniform shade and allows for targeted treatment of specific discoloration.

Combining in-office and laser bleaching techniques can produce superior whitening results compared to using either method alone because of the penetration depth that allows them to reach the dentin layer of the tooth where intrinsic stains are present. This is essential for addressing both extrinsic and intrinsic stains.<sup>6</sup> The high-concentration bleaching agents used in the in-office treatment provide immediate and noticeable results, while the laser enhances the whitening process by accelerating the activation of the bleaching agent. This combination technique is sensitive but easy to use, relatively portable, user-friendly and less invasive. The controlled and precise energy delivery of diode lasers can contribute to a reduced post operative sensitivity if used well.<sup>7</sup> (Figure 3a-d)

The futuristic perspective holds a lot many combination therapies along with laser, many studies on LLLT (Low Level Laser Therapy ) aka Photobiomodulation, is believed to have an anti-inflammatory effect and may reduce the postoperative sensitivity, which could in turn enhance the patient comfort. One more such approach could be incorporation of nanoparticles, such as hydroxyapatite or silica; as these provide protection to the enamel and reduce the sensitivity.<sup>4</sup>

The use and benefits of fluoride gels have not been unknown, as it promotes remineralization and helps with the postoperative sensitivity.<sup>5,8</sup>

Some patients may have moderate tooth sensitivity after the bleaching process. This is managed by applying a desensitizing agent right after following therapy to lessen discomfort. Patients are instructed to use desensitizing toothpaste as needed and to refrain from consuming extremely hot or cold foods or beverages for a few days. Sensitivity is usually mild and goes away in a few days. Visits in between aid in tracking and resolving any persistent sensitivity.

### 4. Conclusion

As per the above discussion, the superiority of the conservative technique for managing extrinsic and mild to moderate intrinsic stains has been noted. The combination technique utilizes the best of both; the in-office bleaching and the laser assisted bleaching for giving synergistic effects in both the cases presented .(7) The results achieved, demonstrated the potential of this advanced technique in achieving significant tooth whitening with minimal side effects. This case study contributes valuable insights to the expanding field of laser assisted cosmetic dentistry.

## 5. Source of Funding

None.


## 6. Conflict of Interest


None.

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