



IN-OFFICE VITAL TOOTH BLEACHING : A CASE SERIES

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Article Received on 10/11/2017

Article Revised on 01/12/2017

Article Accepted on 22/12/2017

ABSTRACT

Successful bleaching treatments in dentistry depend upon correct diagnosis by type, intensity and location of tooth discoloration. It is imperative to determine whether this discoloration is extrinsic, i.e associated with absorption of materials as tea, red wine, iron salts, tobacco etc. on tooth enamel or the pellicle coating on the teeth or the discoloration is intrinsic, where tooth color is associated with light scattering and absorption properties of enamel, dentin, as in fluorosis, tetracycline staining, or as a result of ageing process. Bleaching of teeth however as the only procedure is not satisfactory in certain discolorations caused by abnormalities like amelogenesis imperfecta/ fluorosis of teeth. Additional procedure like microabrasion accompanied with bleaching in such cases is favourable in terms of expected outcome and perceived change in terms of patient satisfaction.

KEYWORDS: Cosmetic dentistry, intrinsic and extrinsic discoloration, bleaching, microabrasion, fluorosis.

INTRODUCTION

Esthetics is an important factor in a patient's decision to undergo dental treatment. Discolouration, especially when of the front teeth means a significant disturbance of esthetics and may decrease a patient's self esteem.

Tooth discolorations can be extrinsic or intrinsic. Extrinsic discoloration can be due to food intake, tobacco stains, or green discoloration associated with Nasmyth's membrane in children. Intrinsic discolorations however are due to presence of chromogenic material within enamel and dentin incorporated during tooth formation or eruption. The most common being amelogenesis or dentinogenesis imperfecta, and endemic fluorosis.^[1] Currently, Dental bleaching has been recognized as a conservative, simplified, and biologically safe approach for treatment of discoloured teeth.

Vital bleaching is an in-office procedure and the most popular systems for in-office bleaching that uses high concentration of hydrogen peroxides and is often referred to as "one-hour bleaching". In-office bleaching generally uses relatively high levels of whitening agents, for example 25–35% hydrogen peroxide containing products, for shorter time periods. Recently, light enhanced bleaching techniques, **a laser activated bleach or merely a paint-on bleaching gel or solution are in use in dental practice.**^[2,3,4]

The following case series present case reports of two patients undergoing in-office vital tooth bleaching for intrinsic and extrinsic discolorations.

MATERIAL AND METHODS

Patient selection criteria

For successful aesthetic vital tooth bleaching, it is important to select patients with conditions that have the best prognosis for successful bleaching. Key factors that have an impact on the final result after bleaching include concentration of the bleaching agent, duration of use of the bleaching agent, type of tooth discoloration, color of the teeth, and patient's age. The criteria for patient selection was:

1. Yellowing of the teeth without any systemic or developmental cause (food, smoking, aging, staining).
2. Mild fluorosis staining.
3. Mild tooth darkening due to trauma.
4. Mild tetracycline staining.

CASE REPORT 1

A 25 year old female patient reported to the Department Of Conservative Dentistry And Endodontics with the chief complaint of discoloration of her front teeth.

Patient was examined to ascertain good periodontal health, no or minimal gingival recession, absence of decay and tooth sensitivity

Bleaching procedure

Case report 1

Initial shade of the patient was recorded and was found to be C2 as verified by universal VITA A1-D4 classical shade guide.



Fig. 1: Initial shade of the patient was found to be C2.

Pola Office bleaching system (SDI, innovative dental products, Australia) was selected for the treatment. It contains 35% hydrogen peroxide, which facilitates significant whitening procedure with a start to finish time of less than an hour.

The surface of teeth was cleaned with pumice. After cleaning teeth were air dried, gingival protection was done with gingival barrier (methacrylate resin, Pola Office, SDI, innovative dental products, Australia) applied to a thickness of 3-4mm and cured using LED curing unit (Bluephase ivoclar Vivadent, Australia) at a wavelength of 480nm for eight minutes.



Fig. 2: Isolation of teeth with gingival barrier.

Contents of the syringe was carefully extruded into the powder pot provided and immediately mixed using a brush applicator until gel turns homogeneous in consistency and color. A thick layer of gel was then placed on all teeth undergoing treatment. The gel on teeth was irradiated for 8 minutes in fanning motion.

Gel application and irradiation cycle was performed 3 times during treatment procedure.



Fig. 3: Bleaching Gel kept in place on surface of teeth.

After each cycle gel was thoroughly cleaned off the surface of teeth whilst gingival barrier is undisturbed. After completion of required number of cycles gingival barrier was carefully taken out and post operative instructions were given to the patient.

Postoperative shade recorded on the same shade guide on the subsequent day was found to be same as on immediate treatment i.e B2.



CASE REPORT 2

A 26 year old male patient reported to the department of conservative dentistry and endodontics with chief complaint of tooth discoloration in all the teeth.

History suggested the patient had been residing in an area with water of high fluoride content where endemic fluorosis was prevalent. Patient was diagnosed with moderate fluorosis of teeth i.e no. 3 according to Dean's fluorosis index.



Fig. 5: Preoperative shade of the teeth showing discoloration due to fluorosis.



Fig. 6: Initial shade was found to be 3M3 on VITA Toothguide 3D- MASTER.

Procedure was carried out following the same steps as in case report 1 and opalescence boost PF 40% (Ultradent) was used as a bleaching agent.



Fig. 6: Bleaching procedure followed microabrasion of the teeth with 18% HCl and Pumice.



Fig. 7: Change in color following bleaching procedure was recorded to be 2M2.



Fig. 8: Final outcome after a combination of microabrasion and bleaching of teeth.

DISCUSSION

There are a number of methods that have been described in the literature for the bleaching of vital teeth. For example, methods utilizing different bleaching agents, concentrations, times of application, product format, application mode and light activation. (Joiner Andrew 2006).^[5]

Minoux and Serfaty recognize that tooth whitening is a very complex process that depends on several factors: 1) the pH of the bleaching agent, 2) the method of application and thickness of bleaching agent on enamel, 3) the fluctuation of irradiation, 4) length of photoactivation, 5) tooth size, 6) selective absorption of wavelength of irradiation, among others.^[6]

Hydrogen peroxide, a commonly used bleaching agent comes in various product formats and in different concentrations. It oxidises a wide variety of organic and inorganic compounds.^[5] It involves diffusion of whitening material to interact with stain molecules and also micromorphologic alterations on the surface and changes within the tooth that affect its optical properties.^[6]

However, certain discolorations of teeth require more than just a normal bleaching cycle that are fitting for use in mild extrinsic discolorations. The technique of **enamel microabrasion** has been suggested as a controlled and non-invasive method for removing stains and discolorations of fluorosis.^[5] The improvement of color through microabrasion occurs due to the creation of a highly mineralized layer, polished, densely compacted becoming an intrinsic part of the external layer of enamel.^[7]

Recent advances in tooth bleaching use different wavelength of curing lights as well as lasers for irradiations. Introduction of a new in-office bleaching agent consisting of a titanium dioxide photocatalyst and 3.5% hydrogen peroxide has been proven to react well with light irradiated at a wavelength of 400nm.^[8] Suyama and Otsuki 2009 showed that halogen light source resulted in a greater bleaching effect than blue LED LCUs. Bleaching as an aesthetic procedure is undergoing change with introduction of newer agents and state of the art techniques.^[9]

CONCLUSION

The combination of techniques in various extrinsic and intrinsic discolorations with the introduction of newer effective bleaching agents enhance a positive esthetic outcome and patient satisfaction.

SOURCE(S) OF SUPPORT: Nil.

CONFLICTING INTEREST: None.

ACKNOWLEDGEMENT

Authors would like to thank Genesis Institute of Dental Sciences and Research, Ferozepur, Punjab for its support.

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