



ORIGINAL RESEARCH PAPER

Dental Science

BLEACHING AND MICROABRASION – A SIMPLE PROCEDURE FOR RESTORING AESTHETICS OF DISCOLOURED TEETH.

KEY WORDS: Bleaching, Microabrasion, Veneers, All Ceramic Crowns, Light Bleaching

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ABSTRACT

Bleaching, laminate veneers and all ceramic crowns are commonly used for esthetic rehabilitation of discoloured teeth. When discoloured teeth have sound intact tooth surface, all ceramic crowns or PFM crowns are least preferred as these restorations requires extensive tooth preparation as compare to laminate veneers and bleaching procedures. The direct and indirect laminate veneers although conservative restorations as compare to full veneer crowns, but still it requires some tooth preparation. bleaching does not requires any tooth preparation. It requires the application of bleaching agent for specific period of time to remove the stains but some times all the discoloration is not removed by bleaching which requires selective grinding of the stained area followed by polishing of grinded surface.

Introduction:

The artistic nature of dentistry and the esthetic awareness of the patients has led to the rising popularity of esthetic dentistry. People today want to be more and more aesthetically pleasing. Discoloration (mild, moderate or severe) of teeth, particularly the anterior teeth effects the esthetics to a great extent. Different types of restorations and techniques such as laminate veneers (direct/indirect), all ceramic crowns, PFM crowns and bleaching can be considered for esthetic restoration of discoloured teeth. All esthetic restorations required preparation of the tooth, whereas bleaching requires only application of bleaching agent on the facial surfaces of the teeth.

Whitening enamel that is composed of one or more abnormal stains, can returns to its original color and translucency to the possible maximum extent. To achieve this goal, there are several techniques and numerous bleaching chemicals, such as hydrogen peroxide and carbamide peroxide in different concentrations, which are ambulatory or used in-office.^{1,2} For over 100 years, the hydrogen peroxide (oxygenated water) has been used, as well as hydrochloric acid, together or separately, for internal bleaching (non vital teeth) or external bleaching (vital teeth).^{1,2} Haywood and Heymann recommended the use of a gel of 10% carbamide peroxide (equivalent to 3.6% hydrogen peroxide) applied with a thin plastic individualized tray for each patient and its use for several hours a day at home for a period of 1-2 weeks. This was the origin of today's most widespread and economic bleaching technique (ambulatory), having the advantage of relying on bleaching substances at very low concentration, therefore, many products of this category are available in the market.^{1,2} Today, most dentists use hydrogen and carbamide peroxide gels between 10-40%, which are chemically activated or by different light sources, such as halogen light, laser or plasma arc.²

CASE REPORT

A 29 year old female reported to a dental clinic with the chief complaint of discoloured teeth (fig. 1). She was reluctant in smiling as that made her loose confidence in herself due to severely stained teeth.

After taking patient's history & doing clinical examination, a diagnosis of dental fluorosis was established. She was presented with two treatment options, bleaching and laminate veneers. As laminate veneers require tooth preparation, she opted for the conservative bleaching procedure for improving the esthetics.

After proper isolation, gingival barrier (fig. 2) was applied on the gingiva extending 0.5 mm into cervical portion of the teeth to prevent leaching of the hydrogen peroxide into the gums. If hydrogen peroxide comes in contact with gums, mucosa or skin, it results in irritation and burning. Gingival barrier prevents it. Gingival barrier should be light cured for 10 to 15 seconds per tooth. Hydrogen peroxide liquid (Pola office, SDI) was mixed with powder (carrier). the mixture should be thick so that it should stay on teeth properly (fig. 3) for required period of time. The bleaching was done till patient was complaining about the sensitivity, which indicates the penetration of hydrogen peroxide into the dentine. once bleaching cycle was completed, hydrogen peroxide was removed with cotton pellets followed by thorough irrigation to clear off any residue of the applied bleaching agent and to prevent the surrounding soft tissue from any injury due to its adverse effect. Due to deep fluorosis discoloration all the discoloration was not removed after bleaching (fig. 4). So selective grinding of discolored area was done with fine diamond bur followed by polishing with pumice and rubber cup (fig. 5).

Desensitizer (2% K fluoride solution) was applied on all the bleached surface to minimize the sensitivity. Patient was recalled after one week and was reviewed intra-orally. (Figure 4) Patient was very satisfied with her esthetic post operatively.

DISCUSSION

Tooth discoloration can be extrinsic or intrinsic in nature. There are many causes of tooth discoloration, but fluorosis is one of the common cause of intrinsic discoloration, which might be mild, moderate or severe in nature. Depending upon the severity of discoloration, different types of techniques can be considered for esthetic rehabilitation of such teeth.

Most of the extrinsic pigmentations can be treated with mechanical or chemical coloring renewal techniques, and advising the patients about their habits and prevention mechanisms to avoid surface stains. The intrinsic pigmentations are those that involve the thickness of the tooth, located in the enamel or dentin. They consist of deep pigmentation, and are difficult for therapeutic options or therefore constituting a clinical challenge to find a solution.³

The in-office technique of vital teeth whitening, uses 30 - 35% hydrogen peroxide and usually a light source. it might requires three to four sessions, depending on the severity of discoloration. the time of exposure of the patient to the application of the

peroxide is 15 to 20 minutes per session to obtain a favourable change of color; it is not recommended to exceed this time to prevent post operative sensitivity.^{3,4}

The most popular tooth whitening is performed in the dental office with 35% hydrogen peroxide, using heat or a light source to enhance the action of the peroxide; as Ferrarazi et al., pointed out, the light sources or laser based photo-activation most commonly used in dentistry are: CO2 argon laser and diode laser; argon laser requires extreme care by the length of emitting wavelength and the thermal properties⁵ In the case of the laser LED, this is more favourable because it emits a blue light with high energy photons that efficiently stimulate the hydrogen peroxide molecule, without the thermal side effect, the great disadvantage of this is the high cost⁵

There are other types of lasers that are called, "the low level laser or diode laser", their mechanism of action functions as a solid arsenate semiconductor generally associated to aluminium, gallium and indium and the electrical energy is converted into laser energy. The wavelength of diodes is well absorbed by the pigmented tissue because they are absorbed by the hard tissues and do not generate heat, also the size of the lamp is manageable and it is available at low cost⁵

Some peroxides diffuse more quickly when activated chemically.⁶ Ferrarazi et al., concluded that LED lamps are effective, safe and inexpensive to activate the hydrogen peroxide,⁵ while Klaric on a temperature rise study stated that Zoom2 lamp compared to LED-405 lamp produced larger increments of temperature to the pulp.^{6,7}

Dominguez et al., stated that the LED lamps are effective and do not produce more than 5.5 degrees (celcius) of temperature increase to the pulp.⁸ These days manufacturers of peroxides are encountering the challenge of redefining and redesigning the indications and concentrations based on several studies that show strong evidence that light sources do not represent an improvement anymore for the in-office dental bleaching technique.^{6,7} Amaral, et al., found that vital teeth bleaching based on hydrogen and carbamide peroxide do not produce morphological changes to the enamel.

Sometimes the severe deep discoloration was difficult to remove with normal bleaching procedures which requires the selective grinding to remove the stains and restore the esthetic. The selective grinding can be done with fine grit diamond burs followed by polishing with rubber cup and pumice.

Conclusion:

Bleaching is a conservative technique for esthetic restoration of discoloured teeth. hydrogen peroxide is one of the most commonly used bleaching agent for in office bleaching technique. Sometimes it is difficult to remove all the stains by simple bleaching procedure which requires the selective grinding of the discoloured area. sensitivity produced by bleaching is a temporary side effect which can be minimized by application of 2% potassium fluoride solution.

Legends:

Fig1. Discoloured anterior teeth



Fig2. Gingival barrier



Fig3. Gingival barrier and hydrogen peroxide mixture



Fig4. After bleaching



Fig5. After microabrasion



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