Bleaching of a non-vital anterior tooth to remove the intrinsic discoloration

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Abstract

Intrinsic discoloration of a non-vital permanent incisor tooth due to trauma may have a significant esthetic and social impact on children and adolescents. Treatment options for discolored Non-vital teeth are bleaching, crowns or veneers. However, this restorative crown or veneer approach has a significant drawback of being an invasive technique. Intervention should be minimal destruction of tooth structure and should not compromise future restorative options. The advantage bleaching over crown is that it offers simple conservative approach in removal of stain and whitening discolored teeth without damaging tooth structure.

Key words: Bleaching, crown, endodontic treated tooth, non-vital, tooth discoloration, veneers

INTRODUCTION

Aesthetics and color of the teeth are reflection of systemic health. Several intrinsic and the extrinsic factors can influence tooth color. [1] While intrinsic discoloration of the tooth may be caused following trauma, loss of vitality, endodontic treatment, and restorative procedures apart from known local and systemic factors. [2-4] Extrinsic tooth stains occur due to poor tooth brushing techniques, smoking, dietary intake of tannin-rich foods, excess use of chlorhexidine mouth wash, and/or consumption of metal salts.[1,5]

Many techniques have been evolved for the purpose of managing discolored non-vital tooth.[6] Amongst these techniques, inside/outside bleaching technique is an effective and conservative treatment option compared to placing restorations.[7-9] In this technique, bleaching is carried out within the tooth and on the outside of the tooth simultaneously. Here, we report a case wherein we have used this technique with improved results.

CASE REPORT

A 30-year-old female patient reported to the institution with a complaint of discolored upper front tooth and desired

the discolored tooth be treated [Figure 1]. On examination, maxillary right central incisor tooth was structurally intact and firm. Mild surface abrasion and vitality test was negative. Intra oral periapical radiograph with maxillary left central incisor revealed a complete root canal obturation without periapical pathology. Patient was explained about the bleaching procedure and consented for the inside and outside in-office power bleaching therapy to correct discolored tooth.[10]

Method of inside and outside in-office power bleaching

Using rubber dam, the tooth to be bleached was isolated and cleaned with pumice and the shade was recorded [Figure 2]. The obturated material was removed from the tooth up to 2 mm below the gingival margin. Stains in the pulp chamber were removed using round bur with the minimal distruction. 1 mm glass ionomer cement (type 1, GC Corporation, Singapore) was placed over the gutta-percha. Using 37% phosphoric acid, pulp chamber was etched for 30-60 s, washed and dried, which resulted in the opening of dentinal tubules. Following this, 38% hydrogen peroxide (pola office ultradent, USA), bleaching agent was mixed into thick paste and placed immediately in the pulp chamber and on the external labial surface of the tooth [Figure 3]. After 10-15 min, the tooth was cleansed and the residue bleach inside was removed with water using a high suction unit. The procedure was repeated four times. Following the final wash, tooth shade was evaluated, which matched with adjacent tooth and satisfactory results were achieved [Figure 4]. The access and the partially empty pulp chamber were restored using tooth colored composite resin.

DISCUSSION

Different options are used in the treatment of discolored endodontically treated anterior tooth. [6] In-office, the bleach has many advantages over the conventional options and is especially, useful in treating the crown and intrinsic discoloration of the tooth. The in-office bleach, which was used in this patient, is discussed here. For a tooth that had discolored following de-vitalization, bleaching is preferable to the crown placement when the tooth is relatively intact.[11] *In vitro* studies suggested that it is the

Figure 1: Discolored maxillary left central incisor tooth

Figure 2: Internal and external bleaching in progress

Figure 3: Guma barrier applied for external bleaching

Figure 4: Post bleaching appearance of the discolored teeth

bulk of the remaining tooth structure rather than the dowel that provides strength and resistance to fracture of the endodontically treated tooth.[12]

A previous study reported no significant difference in the success rate achieved between anterior non-vital teeth with and without crowns.[13] Thus, supporting our view that endodontically treated anterior teeth do not require crowns.[14] Trabert *et al.* also concluded no appreciable difference in the resistance to fracture between untreated anterior teeth and endodontically treated anterior teeth.[12] Further despite small proximal restorations, most pulp less anterior teeth with sound coronal tooth structure can be conservatively restored with the lingual composite restoration.[15] Interestingly, there was no advantage in reinforcement by cementing posts in endodontically treated anterior teeth.[16] In contrast placement of a dowel and crown in such a tooth is likely to weaken rather than strengthening it. For instance, intact endodontically treated anterior teeth with natural crowns demonstrate greater strength against fracture than teeth built-up with pin retained amalgam cores or cast gold dowel cores. Further central incisors were three times more resistant to fracture than the teeth, which were restored with dowel core and crowns.[17]

A laminate veneer may offer a less destructive alternative to the crown. It may mask the discoloration, but also may undergo fracture, debonding, and marginal leakage. However, it requires tooth preparation and is irreversible.[18]

Considering the above reasons in-office bleaching was planned on this patient and desirable results were achieved with patient satisfaction. The major advantage of this approach is (1) it is more conservative (2) more effective in stain removal and (3) significantly improves the appearance of tooth color. Hence, In-office bleaching should be the most commonly adapted method by the dentist as it provides complete control on the process throughout treatment.[19] Moreover, in-office bleaching is usually a rapid process and the results are evident even after a single intervention. Nevertheless, many of the patients prefer this bleaching approach by the dental professional because it requires less active participation on their part. Pola office ultradent xtra boost containing 38% hydrogen peroxide chemically activated without light and heat was used in the current procedure. This dental bleach is extensively used and is well-documented.[20,21] Hydrogen peroxide releases oxygen that breaks down conjugated bonds associated with the stains into a single bond, which in turn can be washed out with water and hence effectively removes the stains. This leads to more absorption of color wavelengths, resulting in tooth whitening effect. The use of light in bleaching had no demonstrable benefit over the chemically activated tooth whitening system.[22]

CONCLUSION

Anterior tooth trauma, with or without fracture/s may or may not involve the pulp. The amount of tooth structure destroyed, location of the fracture and the severities of discolorations are considered while selecting a type of treatment, a type of restorative material and kind of tooth preparation. When anterior tooth is discolored and non-vital, but is structurally intact, it should be preferentially endodontically treated with the minimal access cavity opening and using inside and outside bleach. This approach is minimally invasive than complete ceramic, ceramic fused to metal, or veneers, which removes substantial amount of tooth structure, leading to irreversible damage, and are expensive. This kind of bleaching provides good esthetics and economical benefits to the patients. The type of intrinsic stain can play a significant part in the ultimate outcome of tooth bleaching, and choice of treatment depends on clinical experience and judgment of dentist in context of patient's circumstances.

REFERENCES

1. Watts A, Addy M. Tooth discolouration and staining: A review of the literature. Br Dent J 2001; 190:309-16.
2. Ten Bosch JJ, Coops JC. Tooth color and reflectance as related to light scattering and enamel hardness. J Dent Res 1995; 74:374-80.
3. Walton RE, Torabinejad M. Principles and Practice of Endodontics. 3rd ed. USA: Saunders; 2002.
4. Wray A, Welbury R, Faculty of Dental Surgery, Royal College of Surgeons. UK National Clinical Guidelines in Paediatric Dentistry: Treatment of intrinsic discoloration in permanent anterior teeth in children and adolescents. Int J Paediatr Dent 2001; 11:309-15.
5. Nathoo SA. The chemistry and mechanisms of extrinsic and intrinsic discoloration. J Am Dent Assoc 1997; 128 Suppl:6S-10S.
6. Leith R, Moore A, O'Connell AC. An effective bleaching technique for non-vital, discoloured teeth in children and adolescents. J Ir Dent Assoc 2009; 55:184-9.
7. Nixon PJ, Gahan M, Robinson S, Chan MF. Conservative aesthetic techniques for discoloured teeth: 1. The use of bleaching. SADJ 2008; 63:332, 334-7.
8. Lee SS, Zhang W, Lee DH, Li Y. Tooth whitening in children and adolescents: A literature review. Pediatr Dent 2005; 27:362-8.
9. Attin T, Paqué F, Ajam F, Lennon AM. Review of the current status of tooth whitening with the walking bleach technique. Int Endod J 2003; 36:313-29.
10. Settembrini L, Gultz J, Kaim J, Scherer W. A technique for bleaching nonvital teeth: Inside/outside bleaching. J Am Dent Assoc 1997; 128:1283-4.
11. Standlee JP, Caputo AA, Hanson EC. Retention of endodontic dowels: Effects of cement, dowel length, diameter, and design. J Prosthet Dent 1978; 39:400-5.
12. Trabert KC, Caput AA, Abou-Rass M. Tooth fracture – A comparison of endodontic and restorative treatments. J Endod 1978; 4:341-5.
13. Sorensen JA, Martinoff JT. Clinically significant factors in dowel design. J Prosthet Dent 1984; 52:28-35.
14. Goerig AC, Mueninghoff LA. Management of the endodontically treated tooth. Part I: Concept for restorative designs. J Prosthet Dent 1983; 49:340-5.
15. Guzy GE, Nicholls JI. *In vitro* comparison of intact endodontically treated teeth with and without endo-post reinforcement. J Prosthet Dent 1979; 42:39-44.

16. Lovdahl PE, Nicholls JI. Pin-retained amalgam cores vs. cast-gold dowel-cores. J Prosthet Dent 1977;38:507-14.
17. Bernard GN, Leslie C. Planning and Making Crown and Bridge Book. 4th ed. Informa Healthcare 2007. p. 3-29.
18. Goldstein CE, Goldstein RE, Feinman RA, Garber DA. Bleaching vital teeth: State of the art. Quintessence Int 1989; 20:729-37.
19. Boksman L. Current status of tooth whitening: Literature review. Dent Today 2006; 25:74, 76-9.
20. Poyser NJ, Kelleher MG, Briggs PF. Managing discoloured non-vital teeth: The inside/outside bleaching technique. Dent Update 2004; 31:204-10, 213-4.
21. Gallagher A, Maggio B, Bowman J, Borden L, Mason S, Felix H. Clinical study to compare two in-office (chairside) whitening systems. J Clin Dent 2002;13:219-24.
22. Kugel G, Papathanasiou A, Williams AJ 3rd, Anderson C, Ferreira S. Clinical evaluation of chemical and light-activated tooth whitening systems. Compend Contin Educ Dent 2006; 27:54-62.

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