

MANAGEMENT OF COMPLICATED CROWN FRACTURED AND DISCOLOURED ANTERIOR TEETH MINIMALLY INVASIVE WAY: A CASE REPORT

Dentistry

Arjeet Ghosh*

MDS Resident, Department Of Conservative Dentistry And Endodontics, K. D. Dental College And Hospital, Mathura 281006, Uttar Pradesh, India. *Corresponding Author

Ajay Kumar Nagpal

Professor And Head, Department Of Conservative Dentistry And Endodontics, K. D. Dental College And Hospital, Mathura 281006, Uttar Pradesh, India.

ABSTRACT

Tooth discoloration due to de vitalizing of pulp after trauma can cause aesthetic disturbances and appearance. Internal bleaching is a non-invasive method to restore tooth colour which is performed after endodontic treatment by placing a strong oxidizing agent in the pulp chamber for few days followed by composite buildup of the fractured tooth. A 21-year-old female came to the department with the complaint of the fractured upper left and right incisor tooth and darker right central incisor. In intra oral clinical examination, it showed that complicated crown fracture with 11 and 21 and tooth 11 had discoloured. At the first visit, BMP was done using rotary instrument and gave dressing of calcium hydroxide. 14 days later on the second visit, after obturation with gutta percha, internal bleaching with sodium perborate was done. At the third visit, it showed lighter shade than adjacent tooth and in next visit tooth showed normal desired colour. Then composite restoration done in both of the teeth.

KEYWORDS

Walking Bleach, Intracoronar Bleaching, Nonvital Bleaching, Discoloured tooth, Minimally Invasive Dentistry.

INTRODUCTION:

Patients frequently express aesthetic concerns about tooth dyschromia, or apparent tooth discoloration, which can be caused by a variety of internal and external reasons that deviate from normal tooth colour. Tooth colour can be influenced by variables factors like nutrition, habits as well as factors like trauma, drugs, aging, and progressive dystrophies. Aesthetic procedures are often required when traumatized anterior teeth results in discoloured non-vital teeth. Bleaching treatments are becoming more and more common in modern aesthetic dentistry. Intra coronal or non-vital tooth whitening is often used to treat discoloured teeth that have received root canal therapy. Sodium perborate, commonly referred to as perboric acid, is most commonly used for internal bleaching.

The current case study describes a successful example of employing the walking bleach technique to bleach a discoloured fractured anterior tooth. No negative side effects were noted, and the prognosis seemed hopeful.

Case History:

A 21year old female patient came to our department to fix her discoloured fractured anterior teeth. The patient's medical and family history was non-contributory. Patient had a history of trauma 2 years back due to an accident. Patient undergone root canal treatment to his upper anterior teeth after the trauma but did not complete his treatment. Oral examination revealed complicated crown fracture of maxillary left and right central incisor and blackish discoloration with right maxillary central incisor (FIGURE 2A). Preoperative radiograph (FIGURE 1A) showed access cavity was already done by the previous dentist.

After discussing all the available treatment options patient opted for the minimally invasive treatment option; Root canal treatment followed by intra coronal bleaching and composite restorations. An informed consent was taken from the patient. At first appointment 2% lignocaine with 1:80000 epinephrine (Lignox 2% A, Indoco remedies Ltd, India) was injected prior to rubber dam isolation. Working length (FIGURE 1B) was measured with #25 K file (Dentsply- M access, Switzerland) with help of electronic apex locator (Woodpecker-Woodpex III, China) and confirmed with periapical radiograph. Apical preparation done till #40 K file (Dentsply- M access, Switzerland) then step back technique was used for BMP till the file size #60K file (Dentsply- M access, Switzerland). 5.25% NaOCl (Chemident, India) was used as an irrigant during BMP then canal was flushed with saline. Calcium hydroxide (CalciCure, SafeEndo Dental India Pvt Ltd, India) placed as an intracanal medicament for 14 days and canal was sealed with temporary filling material (Cavit, 3M ESPE, Germany). After 14 days canal was irrigated with saline and sonic activation was done (Endo activator, Dentsply Sirona, USA) for complete removal of calcium hydroxide inside the canal. Canal was dried using appropriate size paper point (Dentsply Maillefer, Switzerland) and master cone

was verified in radiograph (FIGURE 1C). Canal was obturated with GP (Dentsply Maillefer, Switzerland) and AH plus (Dentsply Maillefer, Switzerland) sealer in lateral condensation technique. Same protocol followed for both of the central incisors. Teeth were temporarily sealed (Cavit, 3M ESPE, Germany). In next appointment 2 mm GP was removed from coronal portion of #11 with a heated plugger to create a 2 mm space for GIC (FIGURE 2H). GIC (Ketac Molar, 3M ESPE, Germany) was placed inside the canal till the level of CEJ (FIGURE 2I) and confirmed by radiograph (FIGURE 1D). Sodium perborate (Sodium Perborate Tetrahydrate 96%, Loba Chemie Pvt. Ltd, India) was mixed with distilled water to form a wet sandy consistency and carried into the pulp chamber and placed against the labial wall (FIGURE 2J). A cotton pellet is placed over the sodium perborate and orifice was temporarily sealed with GIC (FIGURE 2K). Patient was recalled after seven days.

In next appoint tooth number #11 showed that it gets bleached (FIGURE 2B). Sodium Perborate was removed from the pulp chamber and pulp chamber was cleaned thoroughly by saline then pulp chamber is closed temporarily and patient is recalled after 7 days.

After 7 days tooth number #11 colour closely matched to the adjacent teeth (FIGURE 2C). Then an impression (Neopure, Orikam, India) is taken of the maxillary arch. A die is prepared from the impression (FIGURE 2D) and wax up was done of the fractured teeth (FIGURE 2E). Then another putty impression taken of the waxed-up model to create a palatal guide. Labial portion of the putty index was removed for easy adaptation to the teeth (FIGURE 2F). Before the rubber dam isolation shade selection was done using composite buttons. Then access cavity was filled with composite and palatal shell was made using composite (Filtek Z250 XT, 3M, India). After that rest of the crown was built in layering technique. Then finishing and polishing (Shofu Super Snap, Shofu Dental India Pvt. Ltd, India) was done. (FIGURE 2G). Patient was recalled after 1.5 year. After 1.5 year tooth was completely asymptomatic and there was some discoloration at the margin in maxillary right central incisor and distal angle get fractured of maxillary left central incisor. Patient was also concerned about the shape of maxillary left central incisor (FIGURE 2L). Periapical radiograph shows there is no periapical pathology nor any resorptive lesions present (FIGURE 1E). Marginal discoloration was masked with composite (Tetric EvoCeram, Ivoclar, India) and fractured distal angle of tooth number #21 was also repaired. Shape of the tooth number #22 was also corrected with composite (Tetric EvoCeram, Ivoclar, India). After that finishing and polishing was done (FIGURE 2M).

DISCUSSION:

Internal pulp bleeding caused by trauma may allow blood components to spread into the dentinal tubules that can cause discoloration of the tooth.(1) Then, during haemolysis, blood degradation products like haemosiderin, haemin, haematin, and haematoidin release iron.(2)

Teeth staining can result from the conversion of iron to black ferric sulfide via the production of hydrogen sulfide by bacteria.(3)

Non-vital bleaching is a less invasive method used to restore discoloured non-vital teeth to their natural appearance. Spasser first described the bleaching technique in which he inserted a paste of sodium perborate and water into the access cavity.(4) We used Sodium perborated with distilled water because there is slight discoloration.

Glass ionomer cement was placed as barrier to prevent apical percolation of bleaching agent below the CEJ and it stays inside the pulp chamber to prevent external root resorption.

External cervical resorption is a serious complication that can occur after internal bleaching.(5) It is usually asymptomatic and detected through routine radiographic examination.(6)

The reason for resorption of bleached teeth have not yet been successfully understood. It has been established that 30% hydrogen peroxide alone or in combination with sodium perborate are more cytotoxic for periodontal cells than perborate-water mixture. (7) Lado et al (8) presumed that internal bleaching procedure leads to denaturation of dentin in the cervical region. This denatured dentin induces a foreign body reaction.

For a tooth that had discoloured following de-vitalization, bleaching is preferable to the crown placement when the tooth is relatively intact.(9) A previous study reported no significant difference in the success rate achieved between anterior nonvital teeth with and without crowns.(10) Thus, supporting our view that endodontically treated anterior teeth do not require crowns.(11)

Non vital bleaching is not being preferred amongst the clinicians because of the fear of resorption following the procedure, which has a poor prognosis. But in this case report adhering to the proper barrier placement methods can definitely prevent the development of the resorption. 1.5 years follow up showed there is no adverse effect of intracorneal bleaching.

CONCLUSION:

Nonvital bleaching followed by direct composite restoration is economical and predictable way to manage complicated discoloured crown fractured tooth. This approach is minimally invasive than full coverage crown, which removes substantial amount of tooth structure, leading to irreversible damage, and are expensive.

Acknowledgement: None

Legends:

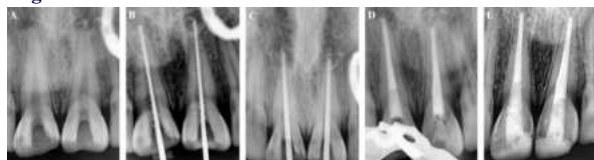


Figure 1: Intraoral periapical radiographs. A) Preoperative, B) working Length, C) Master Cone fit check D) GIC plug placement after obturation, E) 1.5 year follow up radiograph.



Figure 2: Clinical photographs. A) Preoperative, B) Over bleached after 1 week of Sodium Perborate placement, C) 1 week after removal of Sodium Perborate from the access cavity tooth cam book natural colour, D) Die preparation, E) Wax up of the fractured tooth on plaster

model, F) Removal of labial portion from the putty index, G) After composite build up, H) 2 mm GP was removed from to create a space for GIC plug, I) GIC placement till the level of CEJ, J) Sodium Perborate placed in the access cavity, K) Access cavity was sealed with GIC, L) After 1 year follow up, M) After repair of old composite and composite build up maxillary left lateral incisor.

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