

Case Report

Conservative Management of Discoloured Anterior Teeth – A Case Series

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Abstract: The teeth are an integrated part of facial aesthetics and are involved in a complex social, cultural and psychological interactions. Discoloration of anterior teeth is one of the most frequent reason why a patient seeks dental care. In the management of patients with discoloured teeth, knowledge of the mechanisms behind tooth discoloration is of relevance as it can influence the treatment plan. In certain instances it may even have an effect on the outcome of the treatment. The increasing public interest coupled with better technical ability of the dentists, has proved the way for improving aesthetics of darkened teeth. This case series presents different conservative techniques to remove or mask these unaesthetic conditions.

Keywords: Bleaching, Discolouration, Macroabrasion, Veneers

INTRODUCTION

Cosmetic dentistry has become an integral part of restorative dental practice. The appearance of the dentition is of concern to a large number of people seeking dental treatment, and the colour of the teeth is of particular cosmetic importance. Human teeth are considered to be polychromatic in nature and the colour of permanent teeth is mostly either grayish yellow, grayish-white or yellowish-white. The colour of the teeth is influenced by a combination of their intrinsic colour and the presence of any extrinsic stains, that may form on the tooth surface [1].

Extrinsic stains are often promoted by smoking, dietary intake of tannin-rich foods (e.g. red wine), and the use of certain cationic agents like chlorhexidine, or metal salts such as, tin and iron. Intrinsic stains or discolorations are the structural changes or changes in the thickness of dental hard tissues. Chromogenic material is present within the enamel or dentin that is incorporated either during the odontogenesis or after eruption. Pre-eruptive causes are systemic diseases like Alkaptonuria, hematological disorders and liver diseases, usage of medications like tetracyclines and fluorosis induced stains. Post-eruptive causes include pulpal changes due to trauma, dentin hypercalcification, dental caries, restorative materials and operative procedures [2].

Tooth discoloration varies in etiology, appearance, localization, severity, and adhesion to tooth structure. Thus, its treatment options also varies

depending on the type and severity of discolouration, age and oral condition of the patient, location, number and status of the teeth. The aetiology of discolouration is considered first, as this forms the basis for treatment modality to be selected. With the advancements in the esthetic dentistry there have been various treatment modalities, which includes bleaching of discoloured teeth, micro-abrasion, macro-abrasion and veneer preparations. This article presents various cases of discoloured teeth, that were managed conservatively.

CASE REPORTS

CASE 1

A 25 year old male patient reported to the department of Conservative Dentistry and Endodontics with a chief complaint of discoloration of anterior teeth. On clinical examination brownish discolouration was seen involving middle third of maxillary centrals and incisal third of maxillary laterals and cervical third of mandibular right lateral and canine teeth.(Figure 1).Thorough case history was taken, and it was diagnosed as moderate form of fluorosis and was decided to treat conservatively. Microabrasion was done initially with the application of Opalustre(11% hydrochloric acid with silicon carbide, Ultradent)that was applied with a rubber cup in a slow speed handpiece. The tooth surface was then cleansed, the colour change was assessed. As only the superficial stains were removed, macroabrasion was done with a 12-fluted composite finishing bur in a high-speed handpiece. A 30-fluted composite-finishing bur was used carefully to remove hypoplastic enamel to a depth

of no more than 0.3mm. Then the teeth were polished with fluoride containing polishing paste (Cleanicprophy paste, Kerr) to restore surface luster and application of fluoride varnish (Vanish, 3M ESPE) was done to reduce sensitivity and to promote remineralization. Results are shown in figure 2.

CASE 1 – MACRO ABRASION



Fig-1: Pre-operative view



Fig- 2: After micro and macroabrasion

CASE 2

A 28 year old male patient was referred to the department with a chief complaint of discoloration of upper front teeth since 2 years. Patient had no relevant medical history. On clinical examination diffuse mild yellowish intrinsic discoloration was observed over labial aspect of maxillary centrals # (11,21) and over lateral aspect of maxillary laterals # (12,22) (Figure 3). As the teeth were responded normal to vitality tests vital bleaching procedure was planned to treat the discoloration with proper soft tissue protection, rubber dam isolation was done, hydrogen peroxide bleaching gel (35% H₂O₂) (Pola Office one patient kit -Southern Dental Industries Ltd) was applied on the maxillary incisors followed by light activation, which was repeated for 3 applications in one visit. The bleaching procedure was repeated after one week and the desired shade was achieved. Patient was satisfied with the colour change even at 6 month recall visit also (Figure 4).

CASE 2 – VITAL BLEACHING



Fig-3: Pre-operative view



Fig-4: After in-office bleaching

CASE 3

A 30 year old male patient referred to the department with a chief complaint of discoloration and unaesthetic appearance of his upper front tooth. The patient gave a history of trauma to his front teeth 7 years back. On clinical examination blackish brown discoloration was seen on maxillary right central incisor (Figure 5), which gave no response to pulp testing. Root canal treatment followed by non vital bleaching was planned. One week after completion of root canal treatment, walking bleach procedure was performed by placing sodium perborate in the access cavity and sealing. Bleaching agent was changed once a week for 3 weeks. After 3rd week, the tooth showed a definitive improvement in the shade (from initial pretreatment shade of A4 to post treatment A1 shade) which was esthetically satisfactory. Calcium hydroxide was placed in the pulp chamber and sealed to neutralize the affect of bleaching agent. After two weeks calcium hydroxide was removed and access cavity was permanently restored with composite. (Figure 6). Patient was recalled periodically and clinical, radiographic examination revealed sound, esthetically pleasing tooth without rebound effect.

CASE 3 – NON-VITAL BLEACHING



Fig-5: Pre-operative view



Fig-6: After walking bleaching for #11

CASE 4 –DIRECT FULL VEENERS



Fig-7: Pre-operative view



Fig-8: Window preparation design of labial surface.



Fig-9: Composite veneers on #11,21

CASE 4

A 20 year old female patient referred to the department with discoloration of upper front teeth. On clinical examination diffuse brownish areas were observed on the labial surface of maxillary centrals (#11,21)(Figure 7). The case was diagnosed as moderate form of fluorosis. Direct full composite veneers were indicated for the patient as the discoloration was diffuse with dark brown banding type of stains in the middle third of the teeth. The window preparation was done for #11 and 21(Figure 8) because this intraenamel preparation design preserves the functional lingual and incisal surfaces, protecting the veneers from significant occlusal stress. Acid etching was done for 15 seconds, followed by rinsing with water, and bonding agent was applied and light cured. The composite resin shade (A1) was selected through an open discussion with the patient in natural light. Nano-hybrid composite (Filtek Z350 XT) was sculptured on the prepared surface, and light cured, followed by finishing and polishing procedure, which produced esthetically pleasing appearance(Fig-9).

CASE 5

A 22 year old male patient reported to the department with a chief complaint of discoloured teeth. On clinical examination, generalised dark brown banding type discoloration was seen on middle third and yellowish brown discoloration on cervical third of the crowns of both maxillary and mandible anterior teeth (Figure 10). By taking history, it was diagnosed as tetracycline induced discoloration. Tooth # 21 is overlapping on #11 and both teeth are having deep carious lesions on palatal aspect, involving the pulp. Root canal treatment was done for 11 and 21. Ceramic crowns were placed for all maxillary anterior as they were showing grade 4 tetracycline stains, that are

difficult to manage by veneers or bleaching. Direct partial composite veneering was done for all six mandibular anterior teeth which resulted in aesthetic improvement (Figure 12).

CASE 5 – FULL CROWNS AND PARTIAL VENEERS



Fig-10 : Pre operative view



Fig-11: RCT for # 11,21 and crown preparation done for # 11, 12,13,21,22,23



Fig-12 : Partial veneers for # 31,32,33,41,42,43 and ceramic crowns for # 11,12,13,21,22,23

DISCUSSION

Tooth colour is determined by the combination of different optical properties of enamel, dentin and pulp. Extrinsic discolorations can be removed with a prophylactic cleaning procedure, but intrinsic staining

necessitates various treatment options to completely eliminate or even mask the discoloured areas of teeth. Various methods have been suggested to remove or mask discoloration such as microabrasion, macroabrasion, vital or non-vital bleaching, direct or indirect veneering and full crowns. Conservative treatments like microabrasion, bleaching, and macroabrasion offer advantages over the conventional treatments involving partial or complete coverage restorations.

Microabrasion involves the removal of a small amount of surface enamel and classically incorporates both 'abrasion' with dental instruments and 'erosion' with an acid mixture [3]. Some enamel defects or white spots/opacities on the teeth that do not respond to microabrasion, may respond better to macroabrasion. Macroabrasion is the more appropriate approach when the defect extends deeper into enamel. In comparison to microabrasion, macro-abrasion is indicated in deeper stains and defects which extend beyond 0.3 mm of enamel or not more than a quarter of the thickness of enamel. In the first case (moderate fluorosis), initially microabrasion was done, but the surface defect was more than 0.3 mm deep and thus macroabrasion was also done. Defect removal is easier with macroabrasion when compared with other procedures, if an air water spray is used during treatment to maintain hydration of teeth [4].

Teeth exhibiting yellow or orange intrinsic discoloration seem to respond best to vital bleaching. Most of the bleaching gels contain 30-35% hydrogen peroxide because it has a low molecular weight to easily pass through the enamel and dentin. Use of a light to generate heat may accelerate the oxidation reaction of the hydrogen peroxide owing to an immediate whitening of the teeth. This can increase the tooth sensitivity occasionally but that effect is transient[1]. The internal bleaching procedure for endodontically treated teeth is based on the fact that the bleaching agent reaches the dentine faster, directly inside the pulp chamber, and so it reaches the colored molecules faster, degrading them. In the third case (non vital bleaching), Sodium perborate was used as a bleaching agent intracoronally because it is deemed extremely safe [5].

Composite veneers which require minimal removal of tooth structure by single appointment are one of the best treatment choices for discolored teeth [6]. Although ceramic laminate veneers have some advantages like color stability and high resistance against abrasion, they have also some disadvantages including high cost and long chair side time. So, the direct full composite veneers were indicated for the case 4 (moderate fluorosis). Filtek Z350 XT (a nano-hybrid

composite) was used due to its superior mechanical properties and esthetics.

Tetracycline, a broad-spectrum antibiotics were commonly used for the treatment of many infections found in both children and adults. They have the ability to chelate calcium ions and can be incorporated into teeth, cartilage and bone, to form a tetracycline-calcium orthophosphate complexes resulting in discoloration and enamel hypoplasia of both the primary and permanent dentitions, if administered during the period of tooth development. Staining on the teeth can be classified as first grade (mild tetracycline staining), second degree (moderate tetracycline staining), third degree (severe tetracycline staining) and fourth degree (intractable staining) [7]. Normally bleaching, veneers, micro-abrasion and macroabrasion can be successful with the mild form of stains. In the case 5, tetracycline stains for the teeth were considered as fourth degree (intractable staining), which cannot be managed through bleaching or veneers, so the treatment option was full coverage crowns for the maxillary teeth where esthetics is of a major concern. Partial composite veneers were done for the mandibular teeth because full coverage crowns may necessitate extensive removal of the tooth structure. Moreover, mandibular anteriors are less conspicuous as the lower lip hides these teeth, and esthetics is not much of a problem. The patient was satisfied with the conservative approach of veneering for the mandibular anterior teeth.

CONCLUSION

The improvements made by the conservative esthetic dentistry represents a new dimension of dental treatment for patients. The restoration of a smile is one of the most appreciated and gratifying services a dentist can render. To achieve satisfactory esthetic results, the dentist must plan the treatment procedures for discoloured teeth based on the degree of extent of surface defects.

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