CASE REPORT

Conservative Minimal Invasive Treatment of Dental Fluorosis in Pediatric Patients: Report of Two Cases

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ABSTRACT

Aim: Present case report emphasizes on conservative minimal invasive technique to treat enamel fluorosis.

Summary: Children of all ages have a clear perception of esthetics, and so it should be kept in mind while treating them. To eliminate the white-colored (hypoplastic) superficial enamel layer with in office bleaching and for severe cases chair-side re-creation using composite was done. The proposed technique is a simple method to improve the esthetics of fluorosed teeth in comparison to other time consuming and invasive restorative procedures.

Keywords: Bleaching, Child, Dental fluorosis, Esthetics, Veneering.

INTRODUCTION

Water is frequently referred to as a universal solvent because it has the ability to dissolve almost all substances that comes in its contact. Some elements are essential in trace amount for human beings while higher concentration of the same can cause toxic effects. Fluoride is one of them. Due to rapid urbanization and growth of modern industries (anthropogenic source of fluoride) as well as geo-chemical dissolution of fluoride bearing minerals (natural source of fluoride), fluoride concentration is increasing in the environment including water resources. The high concentration in the drinking water leads to destruction of enamel of teeth and causes a number of conditions referred collectively as fluorosis. The problem of high fluoride in groundwater has now become one of the most important toxicological and geo environmental issues in India. It is a proven fact that concentration between 0.6 to1.2 mg/L is essential to protect tooth decay, while higher concentration (beyond 1.5 mg/L) can cause teeth mottling and still higher concentration of fluoride may lead to different major systemic health hazards.[1]

In India, fluorosis was identified in 1937 in Nellore of Andhra Pradesh.[2] Geological crust of India, is rich in fluoride bearing minerals which can contaminate underground aquifers. In Tamil Nadu, Madurai is a known endemic fluorosis area and has fluoride level in drinking water of about 1.5 - 5.0 ppm.[3]

Endemic fluorosis also continues to be a challenging national health problem, particularly in other states as Andhra Pradesh, Punjab, Haryana, Uttar Pradesh, Rajasthan, Gujarat, and Maharashtra.[4] In Uttar Pradesh, Barabanki and Unnao district, around state capital, also comes under high fluoride belt.[5] The choice between treatments depends on the severity of the dental fluorosis, and this may be satisfactorily determined by the Thylstrup and Ferjeskov Index (TFI).[6] Present case reports describes treatment of two children suffering from different degrees of dental fluorosis.

CLINICAL REPORTS

Case 1:

A 16 year old female, with non-contributory medical history reported to the department with a chief complaint of discolored front teeth (Fig. 1). Patient was resident of District Unnao (UP), India. Oral examination revealed that she had moderate fluorosis (Dean's[7] scoring '3' or Thylstrup and Fejerskov[8] index '5') on her maxillary anterior teeth, ie right canine (13) to left canine (23). Patient had average oral hygiene. Enamel in all of her teeth had been chipped off and her right maxillary first molar (16) and right mandibular first molar (46) had undergone severe attrition with no cuspal inclines or morphology present. The first phase of treatment involved oral prophylaxis. Second phase involved delivery of young permanent stainless steel crown (3M ESPE, India) in respect

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Figure 1: Preoperative (Case 1).

to 16 and 46. Third phase involved direct composite veneers in relation to maxillary anterior teeth because of the time constraint given by the patient. The treatment involved veneer preparation with window design. Composite resin used was Nano-composite resin (Ceram-X Duo, Dentsply, India) of enamel shade A2 was used after the application of bonding agent (Prime and Bond NT, Dentsply, India). Polishing of composite restoration was accomplished with Super Snap (Shofu Inc, Japan). The patient was satisfied with treatment outcome (Fig. 2).

Figure 2: Postoperative (Case 1).

Case 2:

A 11 years old male child reported with a chief complaint of discolored upper front teeth. His medical history was non-contributory. Patient was resident of Barabanki District (UP), which comes under fluoride belt area in India. Oral examination revealed that he had mild grade of fluorosis (Dean's[7] scoring 1 or Thylstrup and Fejerskov[8] index '2' in his teeth in respect to 13 -23 (Fig. 3). His oral hygiene was average. After completing oral prophylaxis, in-office bleaching was planned by using 30% carbamide peroxide (H_2NCONH_2). The gel was applied onto tooth using a custom made polyvinyl tray (Fig. 4 and 5). Each bleaching session consisted of application of bleaching gel for fifteen minutes followed by polishing of

Figure 3: Preoperative (Case 2).

Figure 4: Custom tray (Case 2).

Figure 5: Postoperative (Case 2).

teeth with prophylaxis paste. The treatment required three sittings, each scheduled at a week apart interval. The patient was actively followed and satisfied with the outcome when he last reported 6 months after the completion of active therapy.

DISCUSSION

Children of all ages clearly represent their perception of what beautiful teeth and ugly teeth are. These representations provide dental professional a clear view of the child's feelings about dental esthetics.[9]

During the age from 12-18 years according to Jian Peaget who formulated cognitive theory stated that adolescents are egocentric. This dwelling of one's self may make an individual overly self conscious.[10,11]

So it is of utmost importance that while treating a pediatric patient esthetics should be considered as an important aspect.

Heed should also be paid to diagnosis of dental fluorosis. Differential diagnosis between dental fluorosis and non-fluoride induced dental opacities is established clinically by symmetrical and asymmetrical and/or non discreet and discreet pattern of opaque defects respectively.[12] In case 1, the patient had moderate type of fluorosis (Dean's Index- 3)[7] which necessitated that the patient was treated by veneer procedure.[13] Veneers have been successfully employed for management of moderate grade fluorosis.[6] Because of the time constraint given by patient, direct composite veneer treatment option was selected. Composite resin has been used for treatment of dental fluorosis,[14] and in case 1, the treatment involved veneer preparation with window design.[15] Advantage of direct composite veneer is that it is done with minimal chair time when compared to indirect ceramic veneers. In case 2, patient had mild grade of fluorosis (Dean's Index-2)[6] and therefore in-office bleaching procedure with 30% carbamide peroxide gel was advocated.[16-18] Thirty percent carbamide peroxide gel has been successfully used for treatment of mild fluorosis.

Advantage of the procedures described is that these are relatively conservative approaches with minimal invasion of the tooth structure as compared to other restorative procedures. Amount of enamel loss by bleaching is 12 μm,[19] by mechanical application of 37% phosphoric acid is 27-41 μm,[20] and by micro abrasion is 100-200 μm.[21] Other point to ponder is that mineral density of Ca and P by weight percent in outer enamel layer in old age group (55<years) is significantly higher than young age group (18-24 years),[22] so conservative minimal invasive techniques should be the treatment of choice in pediatric patients. In addition, these could be done with minimum chair side time.

A good clinician should be aware of all the treatment options available, assess its merits and demerits, and select the best treatment option according to individual patient needs. Treatment used in cases of mild fluorosis (TFI=1-3) is either by bleaching or micro-abrasion, moderated fluorosis (TFI=4-5) is by combination of both, and in severe cases (TFI>5) by composite or porcelain veneers or by prosthetic crown.[6]

Thus, it can be concluded that for the child's proper psychological development, equal consideration should be paid to esthetics along with function while treating a pediatric patient. Conservative minimal invasive approach allows good esthetic and economical way for treating patient with mild to moderate fluorosis.

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