



Ceramic Veneers in Moderate Fluorosis: - A Case Series

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ABSTRACT

Fluorosis is an endemic disease in India, affecting 20 states out of 36 entities. The excess level of fluoride in drinking water or in diet affects both dental hard tissue and skeletal system of the body. Excess level of fluoride in the body affects ameloblast cells and leads to defective enamel formation. Pigmentation on teeth is the major concern for the patients which compromise their esthetics. Veneers are the most conservative treatment for enhancement of dental esthetics. In this case series two cases of moderate fluorosis were treated with lithium disilicate veneers. Veneers were fabricated with lost wax hot-pressed technique using IPS E-max Press (Ivoclar Vivadent). Follow up was done up to 1 year for both the cases.

Keywords: - Moderate Fluorosis, Lithium Disilicate Veneers, Hot Pressed Lost-Wax Technique.

Received 02.08.2022

Revised 22.08.2022

Accepted 28.10.2022

INTRODUCTION

The excess level of fluoride in drinking water affects both dental hard tissue and skeletal system of body, called fluorosis. 20 out of 36 states in India are affected by this endemic disease. In India, Bihar, Delhi, Maharashtra, Haryana, Karnataka, Madhya Pradesh, Odisha, Tamil Nadu and Uttar Pradesh are high fluorine states [1]. It was first discovered in 20th century as "Colorado brown stains" on teeth. Surplus fluoride in the skeleton affects ameloblast cells and leads to defective enamel formation [2]. It affects children up to the age of 7 years (time for teeth formation, up to 2 years crucial time) and leads to the hypo-mineralization and intrinsic discoloration of permanent teeth [3]. Intrinsic discoloration occurs due to exchange of ions into subsurface porosities of hypo-plastic enamel which grows towards dentino-enamel junction as the disease progresses [4]. Depending upon the discoloration or defects on teeth, dental fluorosis is classified as Dean's fluorosis index and TF index is given in table 1 [5].

Category	Description
Normal	Normal translucent enamel
Questionable	Few white flakes or some white spots
Very mild	Small plaque or white area covering 25% of tooth structure
Mild	Mottled patches covering half surface of a tooth
Moderate	Mottled enamel with brown discoloration
Severe	Complete coverage of tooth with brown discoloration

Sources of excess fluoride (more than 2 ppm) can be community water fluoridation, toothpaste ingestion, and fluoride-rich food etc. [6] Fluorosis teeth are resistance to dental caries or bacterial decay [7] The cosmetic appearance or lustreless enamel is a matter of concern for the patients. Dental treatment depends upon the severity of fluorosis. Here we are presenting two case reports of patients suffering from moderate fluorosis and want aesthetic correction. Overlapped lithium disilicate ceramic veneers were successfully done in both the cases.

CLINICAL REPORTS

Case Report 1:- A male patient of age 28 reported to our Department (Prosthodontics) with the main problem of un-esthetic appearance due to discoloured upper front teeth since childhood. On extra-oral examination, no gross abnormality was detected. All the mandibular movements were within the range and had a low smile line (Figure 1). On intraoral examination brown discolorations were present in all the teeth with hypo calcified enamel (Figure 2) and the patient had an anterior deep bite.



Figure 1 Pre Operative Extra-Oral Smiling View **Figure 2** Pre Operative Intraoral View

Method: - After complete examination, patient was given treatment options, which included correction of the deep bite, direct, indirect veneers and full crown coverage restorations. Diagnostic impressions were made with alginate impression material and cast were poured in stone. The semi-adjustable articulator was used to mount casts in maximum intercuspation position (MIP) with the help of inter-occlusal records. After that mock-up was done and putty index was made (Figure 3).



Figure 3 Putty Index

Temporization was done in the patient's mouth using protemp 4 with putty index. Teeth preparations for incisal overlap veneers were done with respect to 11,12,13,21,22 and 23 using torpedo burs (chamfer finish line) with equi-gingival margins. A reduction of 0.5mm on the cervical region and 1mm in the incisal regions was done (Figure 4). The final impression was made using addition silicon after achieving complete retraction. Final prosthesis was fabricated using IPS E-max press with lost wax hot-pressed technique (Figure 5).



Figure 4 Tooth Preparation Of Maxillary Anterior teeth **Figure 5** Final Prosthesis (Veneers)

Complete isolation was done and trials for adaptation of veneers were done. Surface treatments for teeth and intaglio surface of veneers were done with 37 % phosphoric acid and for veneers 10% HF respectively. Bonding agent was applied on the surface of teeth and final luting was done with dual-cure resin cement with the help of optrastick (Figure 6-8). K-Y Jelly was applied around each veneer to ensure complete anaerobic polymerization. The instructions were told to patients and he was supposed to come for follow up after 1 week, 1 month, 3 months and 6 months post-operatively

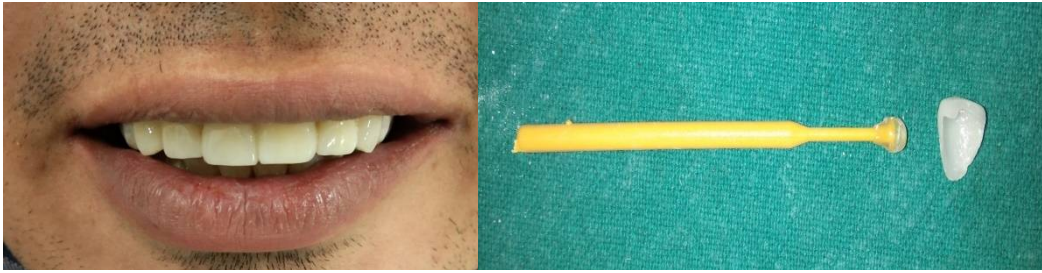


Figure 6 Post Operative Oral Frontal View Figure 7 Final Prosthesis With OptraStick



Figure 8 Post Operative Extra-Oral Smiling View

Case Report 2:- A female patient of age 22 came to our Department (Prosthodontics)with the main problem of unpleasant smile caused by discoloration of all the anterior teeth and of esthetic concern. No gross extra-oral abnormality detected and had a high smile line. On intraoral investigation revealed moderate form of fluorosis and patient had maxillary bone prominence with anterior deep bite (Figure 9).



Figure 9 Pre Operative Intraoral View

Patient was given treatment options, which included correction of maxillary bone prominence, anterior deep bite, direct, indirect veneers and full crown coverage restorations. Diagnostic impressions were made with alginate impression material and cast were poured in dental stone. The semi-adjustable articulator was used to mount casts in maximum intercuspation position with the help of inter-occlusal records. Mock-up was done and the putty index was made. Temporization was done in the patient's mouth using protemp 4 with putty index. Teeth preparations for incisal overlap veneers were done with respect to 11, 12, 13, 21, 22 and 23 using torpedo burs (chamfer finish line) with equi-gingival margins. A reduction of 0.5mm on the cervical region and 1mm in the incisal regions was done (Figure 10).



Figure 10 Tooth Preparation Of Maxillary Anterior Teeth

The final impression was made using addition silicon after achieving complete retraction. Final prosthesis was fabricated using IPS E-max press with lost wax hot-pressed technique (**Figure 11 and Figure 12.**).



Figure 11 Final Prosthesis (Veneers) Figure 12 Post Operative Intra Oral Frontal View

After complete assurance of adaption and verification of occlusion, veneers were cemented using dual-cure resin cement with the help of optrastick (Figure 13, Figure 14). Dental hygiene instructions were specified to her and follow up was done after 7 days, 4 weeks, 12 weeks and 6 months postoperatively



Figure 13 ; Intra Oral View Figure 14 Post Operative Extra-Oral

DISCUSSION

Fluorosis is very common finding in Indian population. Dental fluorosis compromises aesthetics and is major concern for patients. Veneers are the most conservative approach with good aesthetic results. Many materials are used for veneer fabrication ex. Composite for direct veneers, porcelain for indirect veneers. Feldspathic porcelain was the first ceramic introduced for indirect veneer fabrication with sintering technique. Most of the data available in the literature are about this method only. Then comes lost wax hot-pressed technique with lithium disilicate which was introduced by Brodtkin [8]. In this lost-wax technique, a mould is created with wax-up cast and then pre-sintered blocks are pressed into these moulds. These blocks are of multiple shades. Limited clinical data are available in the literature regarding its outcome [9]. Another technique is through CAD-CAM milling, in which veneers are designed and milled by CAD-CAM machine [10- 12]. In this case report, lithium disilicate with lost wax hot-pressed technique was used to fabricate veneers. Because of the marginal adaptation with lost wax hot-pressed technique is much better than other techniques [13]. IPS e.max Press (Ivoclar Vivadent) was used as material. Lithium disilicate glass-ceramic (IPS e-max press) composed of 65% crystalline phase of lithium disilicate. This makes it stronger than other ceramics. It has good optical properties, i.e. translucency with a fracture strength of 3.3 MPa and flexural strength of 400 MPa [14]. Natural appearance with lithium disilicate makes it the choice of material for veneers [15] and due to its high translucent it can't be used in those cases where stump shades are darker [16]. In those cases Zirconia (opaque) may be used. Unsupported ceramic has higher chances of fracture, therefore, required retentive preparation with good adhesion with luting agents. Lithium disilicate has good bonding with resin cement, enamel as well as with dentine [17]. For better adhesion and bonding etching with 10% HF acid with the application of silane coupling agents is recommended on veneers intaglio surface. 37% phosphoric acid and dentine bonding agents on teeth will enhance the bonding. Lithium disilicate is used successfully as veneer material with failure rates of only 0% to 5% over 1 to 5 years [18].

CONCLUSION

Fluorosis is an endemic disease which affects dental and skeletal system of the body. Initially dental hard structures and appearance of a person are affected. Treatment of these discolorations depends upon the severity of the fluorosis. Veneers can be a treatment modality in cases of fluorosis but case selection is the prerequisite. In our case series moderate dental fluorosis was treated with the lithium disilicate veneers to enhance the appearance of fluoresced teeth and enhancing the patient's smile .

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CITATION OF THIS ARTICLE

P Rani, S S Phukela, N Dabas, Nisha, O Shetty, Diksha. Ceramic Veneers in Moderate Fluorosis: - A Case Series. *Bull. Env.Pharmacol. Life Sci., Spl Issue [2]: 2022: 191-195*