

The use of Ceramic Veneers to esthetically rehabilitate a dentition with Severe Fluorosis: A Case Report

Dr N Kalavathy, Dr SonalSaumya, Dr Swapnil Chincholikar, Dr Rohit Prasad

(Professor, Department of Prosthodontics, DAPMRV Dental college and hospital, Bangalore, India

PG Diploma, Department of Prosthodontics, DAPMRV Dental college and hospital, Bangalore, India

MDS, Department of Prosthodontics, DAPMRV Dental college and hospital, Bangalore, India

Assistant Professor, MDS, Department of Periodontics, Faculty of Dental sciences, Ramaiah University of Applied Science, Bangalore, India)

Corresponding author: Dr Swapnil Chincholikar

Abstract: Ceramic veneers are indicated for the esthetic rehabilitation of teeth with midline diastema, fluorosis. The objective of this case report is to highlight the steps in rehabilitation using ceramic veneers. In this case the patient had fluorosis. After preliminary procedures, diagnostic models, waxing, and mock-up were completed, an impression was made with addition silicone, and the veneers were fabricated and cemented with light-cure resin cement. As a result, the esthetics and function expected by the patient were achieved. The use of ceramic veneers enabled a conservative and esthetically successful rehabilitation treatment. The patient was satisfied with the enhanced esthetic appearance. One year follow up displayed acceptable esthetics.

Keywords: Ceramic veneers, Conservative preparation, Dental fluorosis, Teeth discolouration.

Date of Submission: 14-06-2018

Date Of Acceptance: 01-07-2018

I. Introduction

Dental fluorosis is a developmental disturbance of dental enamel, caused by successive exposures to high concentrations of fluoride during tooth development, leading to enamel with lower mineral content and increased porosity. The severity of dental fluorosis depends on when and for how long the overexposure to fluoride occurs, nutritional factors and bone growth¹. Mc Kay and G.V. Black in 1916 published that fluoride can have beneficial effects on dental caries due to its topical effect on the teeth erupted in the oral cavity and detrimental effects on the dentition due to its systemic absorption during tooth development resulting in dental fluorosis².

Esthetic changes in permanent dentition are the greatest concern in dental fluorosis, which are more prone to occur in children who are excessively exposed to fluoride between 20 and 30 months of age. The critical period to fluoride overexposure is between 1 and 4 years old³. The successful treatment of fluorosed teeth depends on the severity of the fluorosis¹.

In the mild dental fluorosis, opaque white areas accompanied with horizontal lines and cloudy patches are seen on the enamel surface. Bleaching and microabrasion have been recommended for these forms of fluorosis. In the moderate-to-severe level of fluorosis, the entire tooth surface is affected by white opacities. Poorly mineralized enamel presents a clinical picture of pitting along with brown stains⁴.

Treatments include microabrasion, direct composite restorations, esthetic veneers or crowns or combination of the above mentioned techniques⁵. Bleaching and microabrasion of moderate to severely fluorosed teeth does not provide a definitive treatment as the results are temporary^{6,7}. Direct (Composite) veneers on the other hand not only discolour but also show wear and debonding from the underlying enamel over a period of time⁸.

Indirect laminate (ceramic) veneers have high fracture resistance and show less discolorations and thus provide an ideal treatment option for esthetic rehabilitation of patients with moderate to severe fluorosis⁹.

This article presents the stages of esthetic rehabilitation of a patient with severe fluorosis with Indirect Laminate (ceramic) veneering for maxillary and mandibular (upto 1st Premolar in each quadrant).

II. Case Report

A 24 year old male patient, Mr Basavraj reported to the Department of Prosthodontics, DAPMRV Dental college and hospital, Bangalore, Karnataka, India with the chief complaint of discoloured teeth.

Complete history of the patient along with preoperative photograph was taken (Figure 1). Medical history was non-contributory. Extraoral examination showed an ovoid face with a convex profile. Intraoral examination revealed dental fluorosis involving all the teeth with cracks identified under illumination. Loss of

the outermost enamel in irregular areas involving less than half of the entire surface presented on most surfaces of maxillary and mandibular teeth. The clinical findings of this patient, as in Figure 1, were : Dental fluorosis of Thylstrup-Fejerskov Index(TFI) = 5-7, based on the 1978 dental fluorosis classification scheme of Thylstrup and Fejerskov¹⁰. Patient was a native of Gulbarga region where the fluoride values varied from a minimum of 0.12 ppm to a maximum of 1.68 ppm which are much above the permissible limit, which range from 0.6- 1.2 ppm in drinking water (WHO, 1994)¹¹. Patient had a habit of consuming 3-5 packets of chewable tobacco for 5 years which he had left 1 year back. Oral prophylaxis was done and dental hygiene maintenance instructions were given.

Radiographic and clinical examination did not reveal any periapical pathology (Figure 2). 8 indirect porcelain veneers for maxillary teeth(14-24) and 8 indirect porcelain veneers for mandibular teeth(34-44) were planned. Anterior guidance was evaluated. A mock up to simulate the desired outcome was performed. It was shown and discussed with the patient and the dental laboratory technician.

Depth orientation grooves were made on the facial surface of the teeth with diamond depth cutting bur 0.3mm and 0.5mm on the gingival half and incisal half respectively.

The tooth structure remaining between the depth orientation grooves was removed with a round end tapered diamond. A chamfer finish line was placed subgingivally. Proximally the tooth preparation was carried up to the contact area but was terminated facial to the contact area. An overlapped incisal edge preparation was chosen because incisal overlap provides a vertical stop that aids in the proper seating of the veneer. The lingual finish line was placed with a round end tapered diamond, approximately one fourth the way down the lingual surface connecting the two proximal finish lines. The finish line should be minimum 1mm away from centric contacts. The veneer extended onto the lingual surface will enhance mechanical retention and increase the surface area for bonding. All sharp angles of the preparation were rounded off.

Gingival displacement was obtained using retraction cord (#000, Ultradent). Impressions were made with 3M ESPE Express VPS Light body regular set and 3M ESPE Express STD putty impression material using the putty wash technique. The shade was selected under direct sunlight with VITA 3D master shade guide.

Ceramic veneers were fabricated using lithium disilicate reinforced pressable ceramic system(Pressed ceramic veneers, IPS e-max, Ivoclar Vivadent). The correct fit of veneers was verified both individually and collectively on the model and then on teeth. The patient was satisfied with form shape and shade of veneers.

The treatment of the intaglio surface of the veneer was done with 5% Hydrofluoric acid(IPS Ceramic etching gel) for 20 seconds washed under running water and dried. A layer of silane coupling agent (Monobond-S, Ivoclar Vivadent) was applied on the inner surface of veneer and gently air dried after one minute. The silane coupling agent forms a chemical bond between the porcelain and resin, besides it also reduces the marginal leakage and discolouration. Final cementation was done with Rely-X U200, 3M ESPE, self adhesive resin cement. The contacts and occlusion were checked. Post operative photographs (Fig 3,4) and instructions concerning oral hygiene and avoidance of habits causing trauma to veneered teeth given.



Fig 1:Diagnostic OPG



Fig 2: Preoperative presentation showing generalized dental fluorosis with discoloration



Fig 3: Veneer(incisal overlap) preparation done from 1st premolar to 1st premolar(maxillary and mandibular teeth)



Fig 4: Gingival retraction with #000 cord



Fig 5: Impressions made in custom tray with the putty wash technique



Fig 6:IPS E Max veneer copings trial

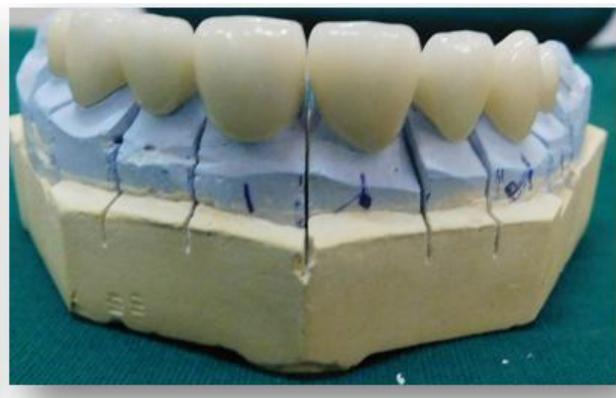
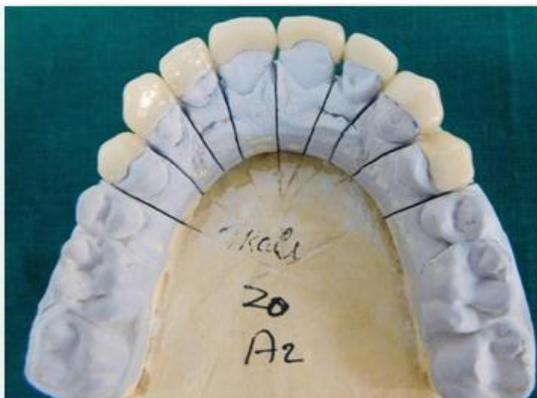


Fig 7: Upper and lowerIPS E Max Veneers on cast



Fig 8: Intraoral view post cementation



Fig 9: Maxillary and mandibular occlusal view post cementation



Fig 10: Happy and satisfied patient

III. Discussion

The main objective of the treatment in this case was to restore the patient esthetics and self-esteem. Various treatment modalities have been proposed for the treatment of fluorosed teeth depending on the severity of the fluorosis^{6,7}. A direct composite restoration is a conservative alternative which offers the ability to correct the shape and the contour of anterior teeth in addition to the removal of discoloration⁸. Although using direct composite provides excellent esthetics; the fracture resistance, wear resistance and color stability of composite resin is lower than indirect porcelain restorations. Ceramic Veneers are considered to be a more conservative treatment approach than full crowns because preparation of the teeth for veneers requires conservative tooth reduction than full crown preparations. Porcelain veneers provide precise color match and translucency to the natural tooth and fulfill the need for adequate retention⁹.

Porcelain veneers have become the major modality of treatment when conservative aesthetic restoration of anterior teeth is needed. Minimally invasive preparation designs and modern ceramic materials make this treatment option increasingly conservative to the natural tooth structures, while providing both predictable and long-lasting aesthetics⁹. Porcelain veneers ensure color and translucency close to those of the natural tooth as well as fulfilling the need for adequate retention, while preserving maximum remaining tooth structure. Porcelain veneers involving the incisal edge, proximal areas, and parts of the palatal surface have been recognized as an alternative to full crowns in the anterior dentition⁹. The versatility of veneers allows them to be used for a number of indications such as fluorosis, midline diastemas. Overall ceramic veneers offer satisfactory, predictable, and lasting results⁹.

IV. Conclusion

Successful laminate veneers depend upon clinician's ability to select the appropriate material to match intraoral conditions and esthetic demands. Advancement in the technique, ceramic materials, and luting cements has made porcelain and composite veneering the most accepted treatment for esthetic correction of the anterior teeth over full coverage restorations. The veneers are technique and material sensitive but if used with proper knowledge and skill, these restorations provide the best esthetic and functional outcome. The predictability of any restorative process will rest on the precise evaluation of oral and occlusal conditions.

References

- [1]. Akpata ES, Occurrence and management of dental fluorosis. *Int Dent J* 2001 Oct, 51: 325-333.
- [2]. Sherwood IA, Fluorosis varied treatment options. *Journal of conservative dentistry* 2010 June, 13: 47-53.
- [3]. Shah N, Nadgere J, Khanna T, Restoring Maxillary Lateral Incisors with Ceramic Laminate Veneers: An Esthetic Challenge. *International Journal of Prosthetic Dentistry* 2010, 1: 10-11.
- [4]. Denbesten P, Li W, Chronic fluoride toxicity: dental fluorosis. *Monogr Oral Sci* 2011, 22: 81-96.
- [5]. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G, Porcelain veneers: a review of the literature. *J Dent* 2000 28: 163-177.
- [6]. Goldstein CE, Goldstein RE, Feinman RA, Garber DA. Bleaching vital teeth : State of the art. *Quintessence Int* 1989 Oct; 20(10):729-737.
- [7]. Train TE, McWhorter AG, Seale NS, Wilson CF, Guo IY. Examination of esthetic improvement and surface alteration following microabrasion in fluorotic human incisors in vivo. *Pediatric Dent* 1996 Sep-Oct; 18(5):353-362.
- [8]. Walls AW, Murray JJ, McCabe JF. Composite laminate veneers: a clinical study. *J Oral Rehabil* 1988 Sep
- [9]. Piddock V, Qualtrough AJ. Dental ceramics-an update. *J Dent* 1990 Oct; 18(5):227-235; 15(5):439-454.
- [10]. Thylstrup A, Fejerskov O. Clinical appearance of dental fluorosis in permanent teeth in relation to histologic changes. *Community Dent Oral Epidemiol* 1978 Nov; 6(6):315-328.
- [11]. Rekha .S, Choudhary, Dr. Mohan I Naik. Ground water quality analysis of villages in Gulbarga district , *Int. J. Adv. Res. Biol. Sci.* 2017. 4(3): 77-85