Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies *NLM ID: 101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Case Report

Aesthetic Rehabilitation of Dental Fluorosis and Diastema Using Ceramic Veneers - Case Report

[1]Gaurav Pandey, [2]Indra Gupta, [3]Anubhuti Agrawal, [4]Kabir Bulchandani, [5]Madhulika Benerjee, [6]Dipali Kumari

[1,3,5,6]Postgraduate, [2]Professor, Department of Conservative Dentistry and Endodontics, Rishiraj College of Dental Sciences, Bhopal, M.P, India;
[4]Postgraduate, Department of Conservative Dentistry and Endodontics, RUHS College of Dental Sciences, Jaipur, Rajasthan, India

ABSTRACT:
Dental fluorosis is a developmental enamel defect resulting from excessive fluoride exposure during odontogenesis, often leading to both aesthetic and structural impairments. The condition can significantly affect an individual's psychological and social well-being, with management strategies varying based on severity. This case report describes a conservative, interdisciplinary approach to the treatment of moderate dental fluorosis through a combination of in-office bleaching and lithium disilicate ceramic veneers, aimed at achieving optimal aesthetic and functional outcomes.
Keywords: Fluorosis, veneers, in-office bleaching

Received: 16 July, 2025 Accepted: 24 August, 2025 Published: 27 August, 2025

Corresponding author: Gaurav Pandey, Postgraduate, Department of Conservative Dentistry and Endodontics, Rishiraj College of Dental Sciences, Bhopal, M.P, India

This article may be cited as: Pandey G, Gupta I, Agrawal A, Bulchandani K, Benerjee M, Kumari D. Aesthetic Rehabilitation of Dental Fluorosis and Diastema Using Ceramic Veneers - Case Report. J Adv Med Dent Scie Res 2025; 13(8):56-65.

INTRODUCTION

One of the causes of low self-esteem in the adolescent and adult population is anterior tooth discoloration. There could be a number of causes for discolouration, depending on whether the source is intrinsic or extrinsic. One such condition is dental fluorosis, which is caused by excessive fluoride intake during tooth development.[1] Dental fluorosis is a common dental condition, especially in places where the water supply contains high amounts of fluoride or where fluoride is consumed through other means. When fluoride levels in drinking water surpass 0.5–1.5 mg/l, ameloblasts may undergo metabolic changes that lead to a damaged matrix and incorrect tooth calcification.The amount of fluoride consumed and the length of exposure during tooth growth determine the degree and severity of fluorosis.[2,3]

The severity ranges from extremely minor to severe. Chalky white opaque patches on the enamel surface are caused by very mild and mild types. Moderate form is characterized by minor enamel pitting and obvious enamel staining, which can range from white specks to brown discolouration. Significant brownish discoloration, pitting, and worn-out teeth are signs of severe fluorosis. Various treatment modalities can be applied depending on the severity of fluorosis.[4] In minor cases, no treatment may be necessary if the patient has no aesthetic concerns.

Bleaching, microabrasion, macroabrasion, resin infiltration, composite veneers, and lithium disilicate veneers are cosmetic procedures that can be performed on patients with mild to moderate fluorosis and aesthetic concerns. When fluorosis is severe, complete mouth rehabilitation and full coverage crowns are frequently needed.

Dental fluorosis's aesthetic consequences can negatively affect a person's quality of life in relation to oral health and have an impact on their psychosocial well-being. It has been shown that both teenage and adult populations find the clinical manifestation of moderate to severe fluorosis to be unsightly. This case study demonstrates a conservative method of employing lithium disilicate veneers and in-office bleaching to restore the appearance of a patient with moderate dental fluorosis.[5,6]

CASE REPORT

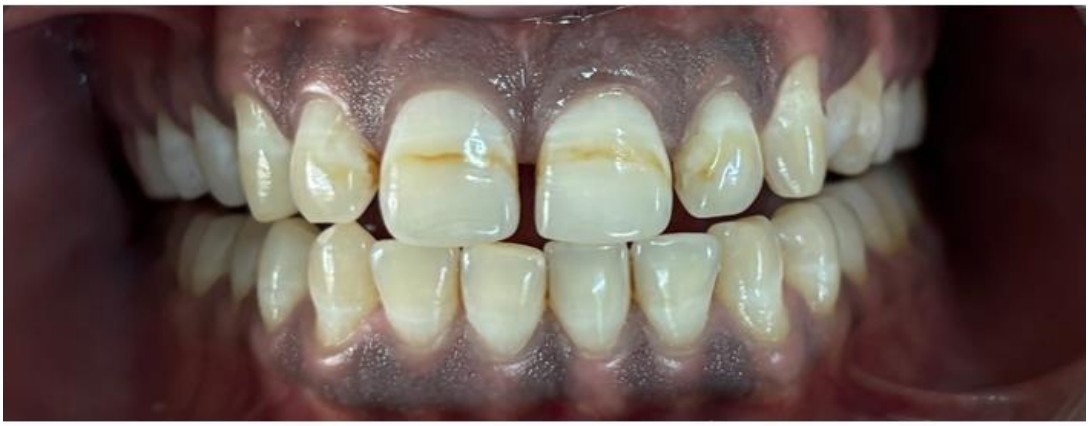
A 27-year-old male patient reported to the Department of Endodontics with the chief complaint of an 'unpleasant smile' attributed to tooth discoloration and spacing between the anterior teeth. Clinical examination revealed satisfactory oral hygiene.

Generalized enamel fluorosis was noted, characterized by diffuse white opaque areas involving most tooth surfaces. Localized brown stains were observed on the maxillary central and lateral incisors. Additionally, irregular loss of the outer enamel surface was evident on the anterior teeth.(Figure1)

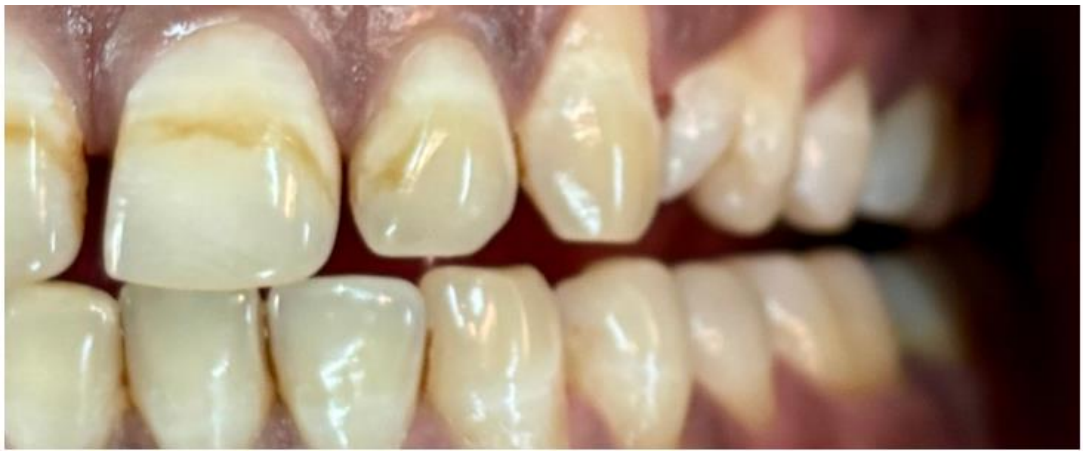
The patient exhibited a Class I occlusal relationship, with a 2 mm overbite and a 3 mm overjet. Periodontal health was found to be satisfactory. Radiographic examination revealed no evidence of caries or alveolar bone loss. Based on the patient's history, clinical presentation, and assessment using Dean's Index, a diagnosis of moderate dental fluorosis was established

A comprehensive dental and medical history revealed that tooth discoloration had been present since childhood, with similar findings reported among family members. The patient acknowledged awareness of having fluorotic teeth and expressed a desire to improve the esthetics of his smile

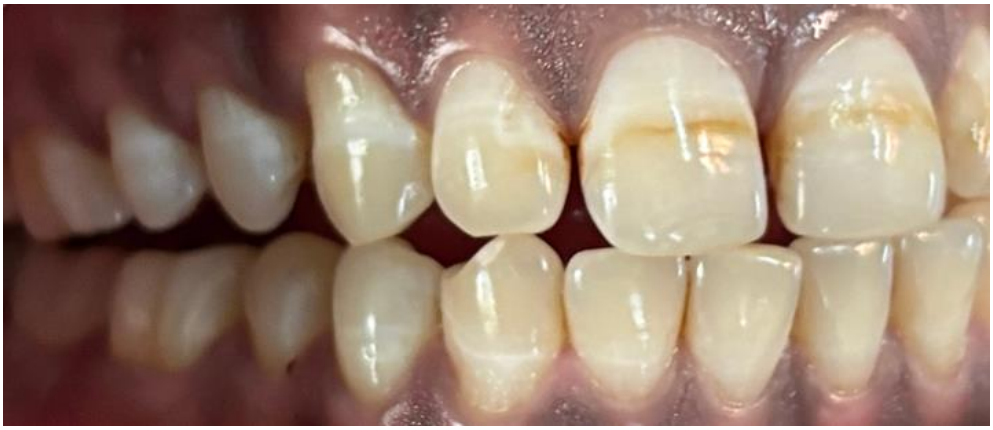
Various treatment options ranging from minimally invasive to extensive procedures were considered, including in-office bleaching, composite veneers, lithium disilicate veneers, full-coverage porcelain-fused-to- metal crowns, and all-ceramic crowns. Given the extent of fluorosis, an in-office bleaching protocol using 35% hydrogen peroxide was selected to lighten the brown stains, followed by the placement of porcelain laminate veneers on the maxillary anterior teeth.



(a)



(b)



(c)

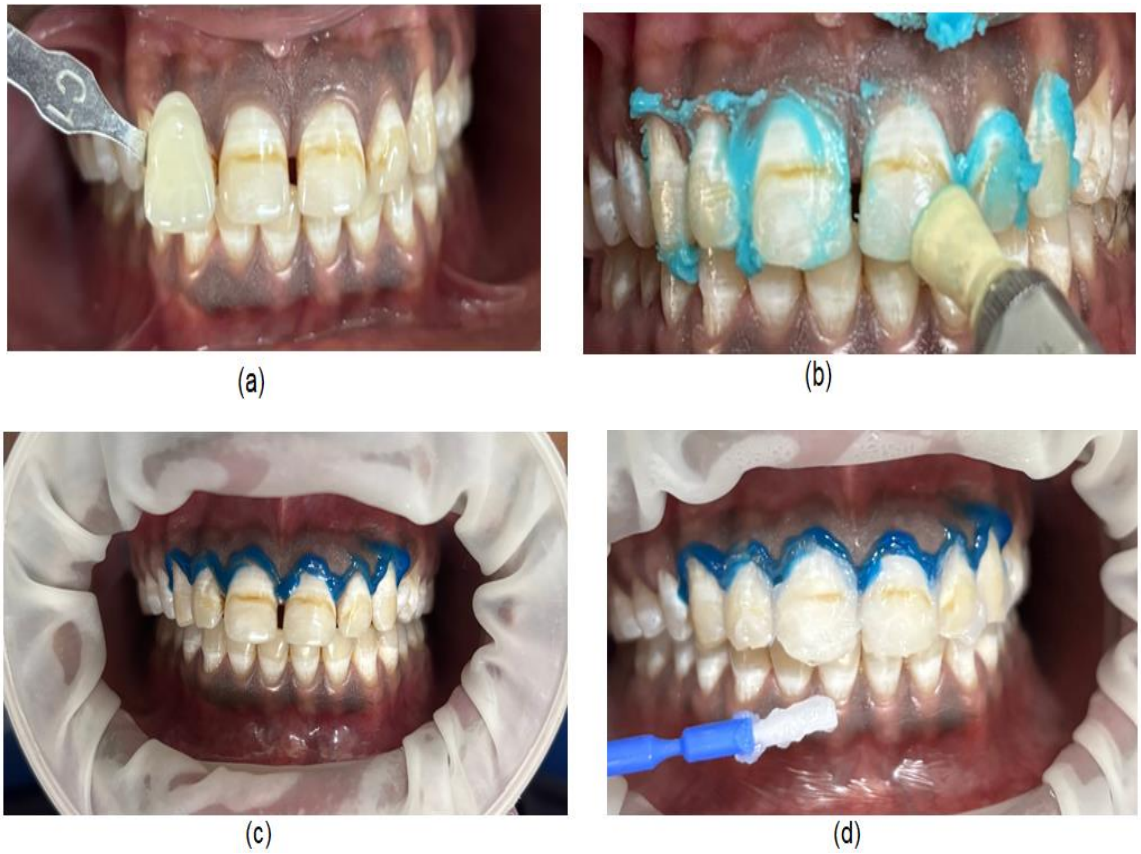
Figure 1- Pretreatment intraoral (a) frontal view (b) right lateral view (c) left lateral view

Procedure

Diagnostic impressions of the maxillary and mandibular arches were obtained using an elastomeric impression material (Dentsply Aquasil Soft Putty), and the diagnostic casts were subsequently poured. (Figure 2)

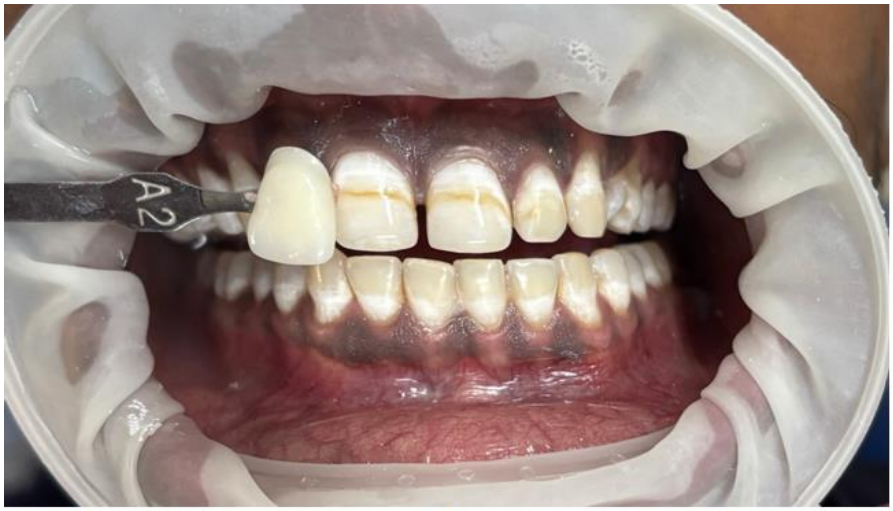
In-Office Bleaching

Informed consent was obtained from the patient prior to treatment. The preoperative tooth shade was recorded using the VITA Toothguide 3D- MASTER, and clinical photographs were taken. The teeth were cleaned with a pumice slurry. The maxillary teeth indicated for treatment were isolated, and a light-cured gingival barrier was applied and polymerized for 20 seconds. In-office bleaching was performed using 35% hydrogen peroxide gel (Pola Office, SDI Limited, Australia), applied for 8 minutes per cycle. The gel was suctioned off and the procedure was repeated twice. Following removal of the gingival barrier, the postoperative shade was assessed. The preoperative shade of C1 improved to A2 post-treatment.



(a) (b)

(c) (d)



(e)

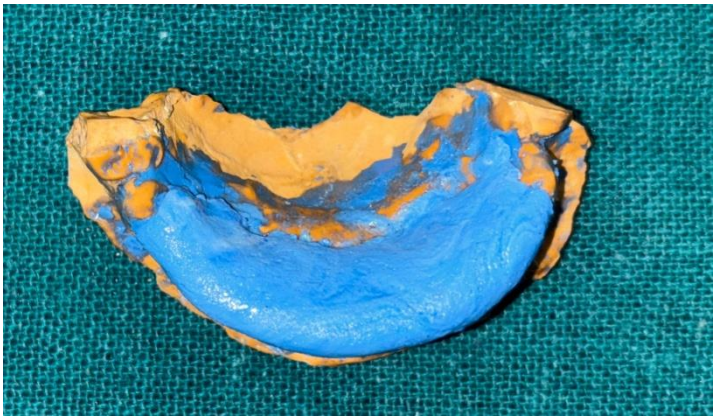
Figure 3- Inoffice bleaching technique (a) Preoperative shade determined (b) Pumice slurry applied over tooth surfaces to be treated and cleaned with brushes and rinsed (c) gingival barrier was applied (d) application of bleaching agent (e) Final postoperative shade determined.

Mock-up

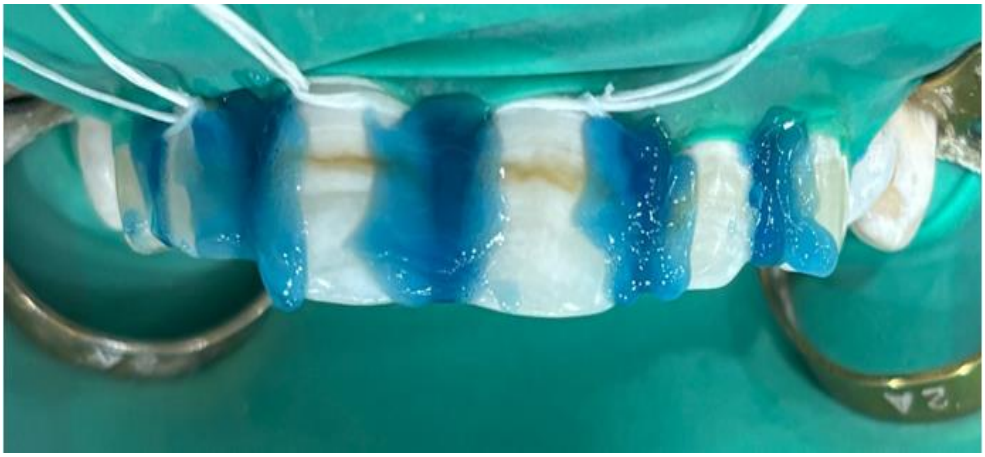
A diagnostic wax-up was completed, followed by the fabrication of a silicone putty index preparation guide based on the wax-up. During the subsequent appointment, the index was utilized to transfer the mock- up onto the patient's teeth using a bis-acrylic composite resin, thereby creating Aesthetic Pre-evaluative Temporary (APT) restorations.

Occlusion and esthetics were carefully evaluated, along with assessment of phonetics and speech. Following the procedure, the patient was discharged and advised to assess and adapt to the shape and size of the restorations at home.

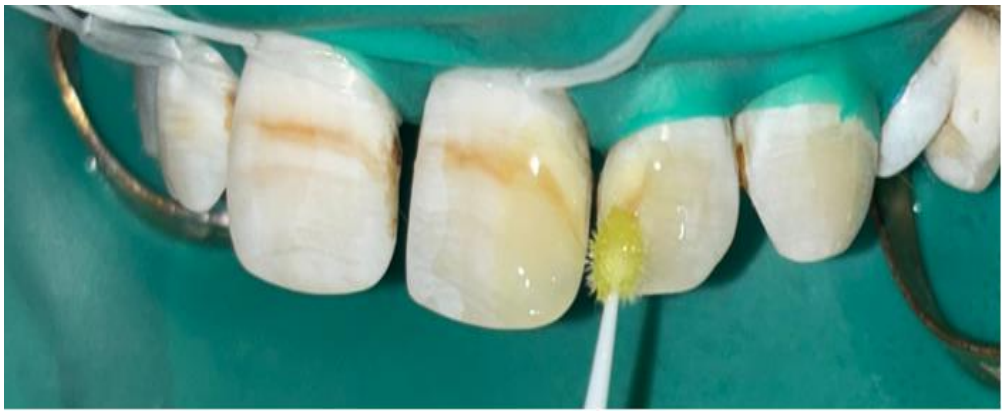
Figure 4: Wax Mockup on diagnostic cast



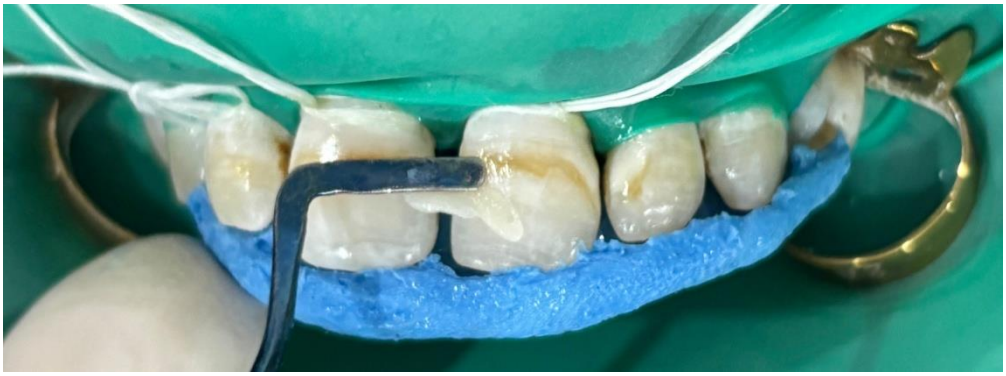
(a)



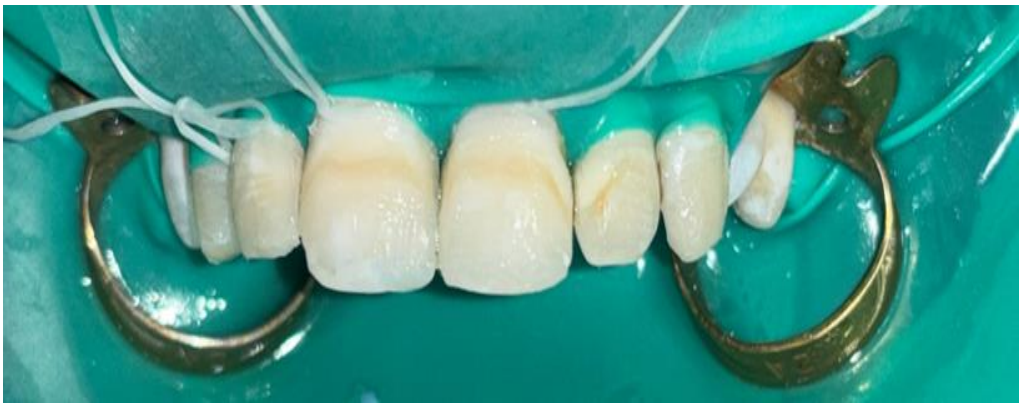
(b)



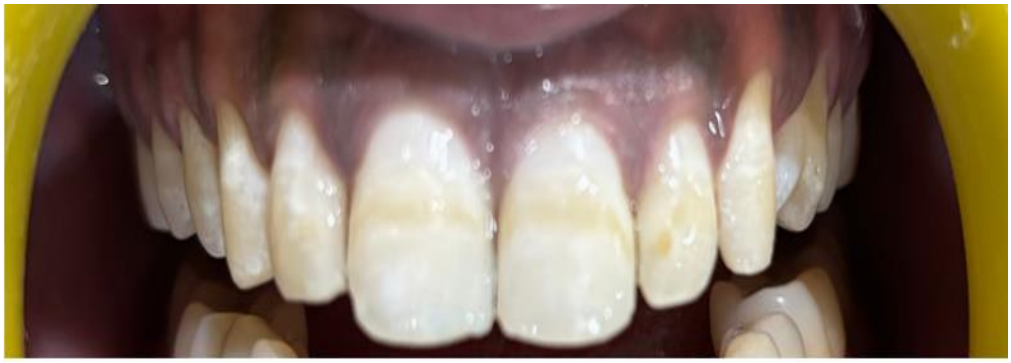
(c)



(d)



(e)



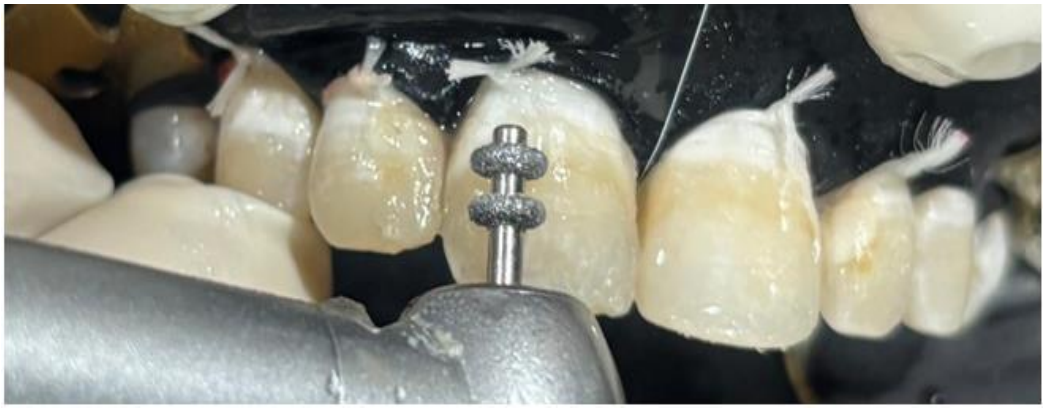
(f)

Figure 5 - Intraoral view with mockup technique: (a) Fabrication of index (b & c) Application of etching and bonding agent (d) composite buildup with indexed technique (e & f) Final mockup view

Ceramic Veneers

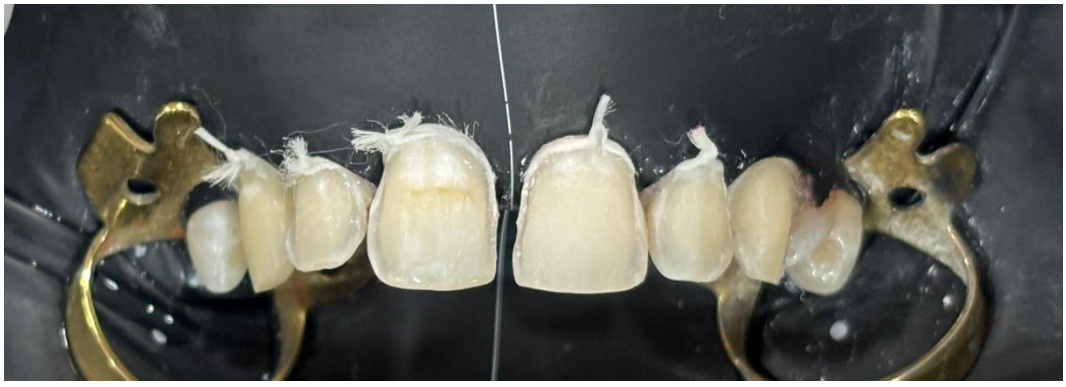
At the subsequent appointment, the patient returned to the clinic highly satisfied with the results of the mock-up and expressed a desire to proceed with the definitive treatment . Upon comprehensive evaluation and obtaining informed patient consent, shade selection was finalized, and tooth preparation was initiated**.**

Tooth preparation was performed through the APT mock-up, beginning with a 0.3 mm depth-cutting diamond bur. Labial reduction was carried out in three planes using a round-ended tapered diamond bur to achieve uniform reduction and enhanced esthetics. Interproximal reduction extended slightly beyond in cervical third, while preserving the contact point. All line angles were rounded and the prepared surfaces were polished.

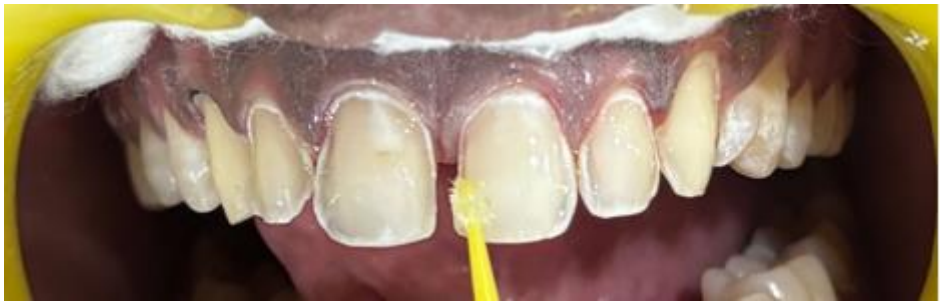


(a)

Gingival retraction was performed using a 3-0 retraction cord. A two- step final impression was made using polyvinyl siloxane impression material (putty and light body). Immediate dentin sealing (IDS) was was done with bonding agent. Provisional restorations were fabricated using a bisacrylate temporary material (Oratemp). The final impression, along with the waxed diagnostic cast and photographic documentation, was sent to the dental laboratory for the fabrication of porcelain veneers**.**

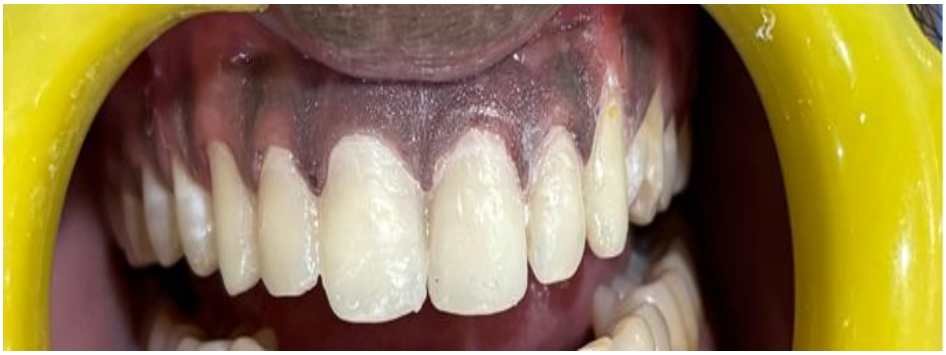


(b)



(c)

(d)



(e)

Figure 6 - Preparation of teeth and temporization done (a) Preparation with depth cutting and tapered fissure bur (b) final preparations (c)Immediate dentin sealing done (d & e) loading and temporization done

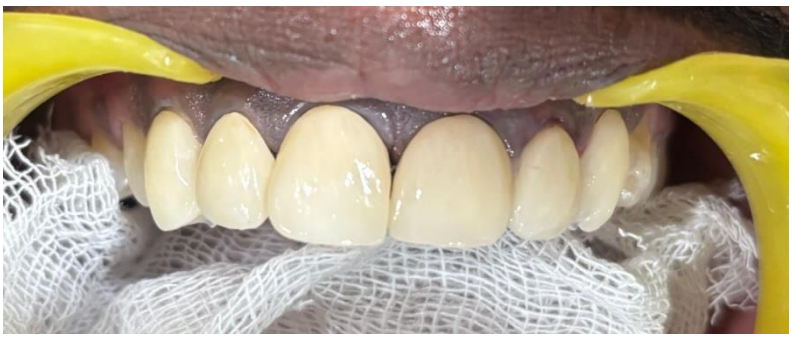
In the following appointment, the fabricated veneers were initially assessed on the master cast. After thorough cleaning of the tooth surfaces, each veneer was evaluated intraorally, both individually and collectively, using a try-in paste. The fit, adaptation, and marginal integrity were critically assessed. As no adjustments were necessary, and both the fit and shade were approved by the clinician and patient, final adhesive cementation was performed**.** The prepared teeth were re- cleaned with water spray, and the veneers were luted in place with predictable results.

Cementation Protocol

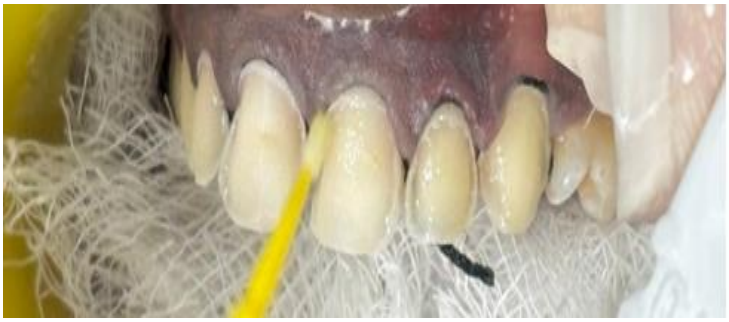
Prior to the cementation procedure, complete isolation was achieved using an OptraDam, and a gingival retraction cord was placed to ensure full exposure of the margins. The intaglio surface of the veneers was etched with 9% hydrofluoric acid for 90 seconds, followed by thorough rinsing and removal of excess moisture. A frosted appearance confirmed effective etching.

Subsequently, 37% phosphoric acid was applied for 5 seconds, and excess moisture was removed. A silane coupling agent was then applied using an applicator tip for 60 seconds and air-dried. Meanwhile, the prepared teeth were polished with a pumice-water slurry, then etched with 37% phosphoric acid, rinsed, and dried. A bonding agent was subsequently applied to the tooth surfaces and each tooth surface was individually isolated using Mylar strips to prevent interproximal bonding and ensure precise cementation.. Light cure resin cement (Ivoclar Variolink Esthetic LC) was used for bonding. Tack curing was performed for 5 seconds to facilitate the removal of excess cement using an explorer. All surfaces of the veneers were then light-cured for 20 seconds each to ensure complete polymerization. Residual cement was carefully removed with an explorer and dental floss. Final finishing was accomplished using rubber polishing cups. Occlusion

was evaluated in both protrusive and lateral movements, with no interferences detected. Postoperative instructions were provided, and the patient was advised to maintain meticulous oral hygiene.



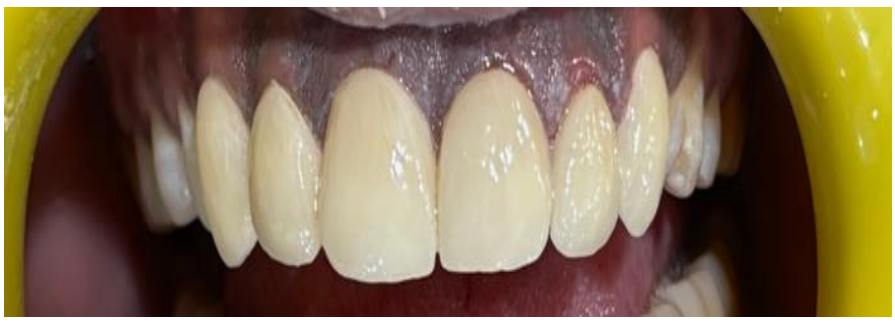
(a)



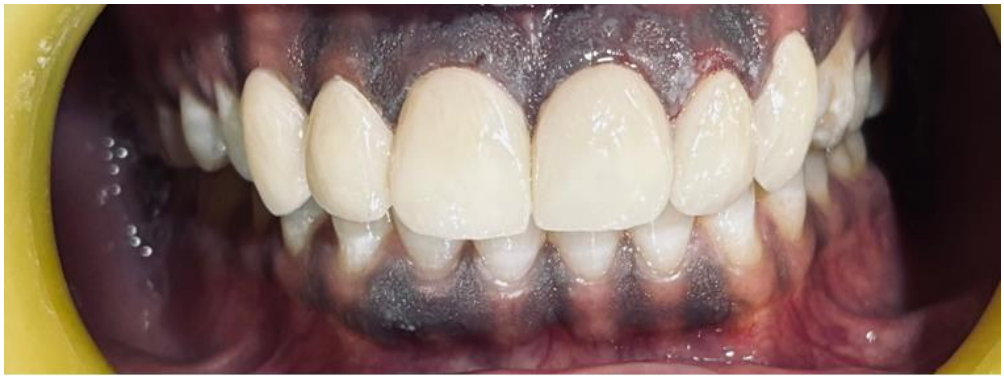
(b)

(c)

(d)



(e)



(f)

Figure 7- (a) Try-in (b) application of bonding agent (c) Pretreatment with 9% hydrofluoric acid and silane coupling agent (d) application of luting agent (e & f) Final outcome after veneer placement

Upon completion of the treatment, a significant improvement in the patient's esthetic appearance was observed. The patient expressed complete satisfaction with the final outcome

DISCUSSION

Dental fluorosis is a developmental disturbance of enamel caused by overconsumption of fluoride. Excessive fluoride exposure disrupts enamel mineralization by inhibiting apatite crystal growth and interfering with the degradation of enamel matrix proteins.[7] These structural defects in the enamel result in a whitish to brown discoloration, with the clinical appearance varying according to the severity of dental fluorosis.8

Various treatment options have been recommended for the treatment of dental fluorosis ranging from minimally invasive treatments, like tooth whitening or micro-abrasion, to more extensive prosthetic rehabilitations with fixed restorations.[6] The choice of treatment is guided by the extent and severity of the condition, in conjunction with the patient's esthetic expectations and individual preferences.

In this case, the patient was a young adult presenting with discolored teeth and spacing between the maxillary anterior teeth. An initial treatment plan involving bleaching followed by orthodontic correction for the diastema was proposed. However, the patient declined orthodontic treatment due to time constraints and wanted a immediate esthetic solution. Consequently, Bleaching and ceramic veneers were planned to address the discoloration and spacing concerns.

In-office bleaching is a straightforward, efficient, and non-invasive approach to managing tooth discoloration.[9] In this case, it was performed to reduce the intensity of staining prior to veneer placement. According to the CIELAB color system, bleaching resulted in a decrease in the b value (indicating reduced yellowness) and an increase in the L value (indicating enhanced lightness).[10] This improvement in tooth shade significantly contributed to the overall esthetic success of the final veneer restorations.

The treatment approaches implemented in this case were specifically aimed at improving the patient's smile and achieving an esthetic restoration of the dentition.

According to Demirekin and Turkaslan, ceramic veneers have been shown to provide durable and successful restorations, with an estimated 10-year survival rate of 93.5% in individuals affected by dental fluorosis. Ceramic veneers offer additional advantages, including excellent biocompatibility, high abrasion resistance, favorable translucency, and long-term stability in both color and contour.[11,12] Moreover, the risk of gingival irritation is reduced, as ceramic veneers tend to accumulate less plaque compared to natural teeth. Aesthetic Pre-evaluative Temporaries (APT) were transferred intraorally to simulate the final restoration. This step allowed for precise evaluation of key esthetic parameters such as incisal edge position and facial tooth contours.[13,14]

A proper bonding protocol is crucial for the long-term success of ceramic veneers. The selection and application of appropriate surface treatments and cementation techniques play a pivotal role in achieving durable and reliable restorations.10 Despite the compromised bonding characteristics of fluorosed enamel, in vitro studies have demonstrated that the incorporation of phosphoric acid etching can significantly enhance bond strength in cases of moderate to severe dental fluorosis.This leads to enhanced penetration of resin tags, resulting in a thicker and more stable resin–enamel interface.[15]

CONCLUSION

Dental fluorosis can present with a wide range of clinical manifestations, varying in severity and extent—even within the same individual. Therefore, determining the appropriate treatment approach requires a comprehensive evaluation of the affected teeth, taking into account both the functional requirements and esthetic expectations of the patient. By combining in-office bleaching with the subsequent placement of veneers, a satisfactory esthetic outcome was achieved, effectively meeting the patient's expectations.

REFERENCES

1. Deepika, Kumari & Bansal, Kriti & Gupta, Rekha & Gill, Shubhra. (2023). MANAGEMENT OF DENTAL FLUOROSIS BASED ON
2. SEVERITY INDEX. International Journal of Advanced Research. 11. 2320-5407. 10.21474/IJAR01/16382.
3. Iheozor-Ejiofor Z, Worthington HV, Walsh T, O'Malley L, Clarkson JE, Macey R et al. Water fluoridation for the prevention of dental caries. Cochrane Database Syst Rev 2015;6:1-10
4. Garg I, Kumar A, Kumar A. Comparative evaluation of esthetic improvement of resin infiltration (RI), in-office bleaching (B), enamel microabrasion (M) and resin infiltration with double application of infiltrant (2RI) on non-pitted fluorosis stains: a randomized six-month interventional study. International Journal of Clinical Pediatric Dentistry. 2022 Jan;15(1):20.
5. Sherwood IA. Fluorosis varied treatment options. Journal of Conservative Dentistry and Endodontics. 2010 Jan 1;13(1):47-53.
6. Lee JD, Inoue N, Lee C, Park S, Lee SJ. Comprehensive management of severe dental fluorosis with adhesively bonded all- ceramic restorations. Prosthesis. 2021;3(3):194-208.
7. Akapata ES. Occurrence and management of dental fluorosis. Int Dent J. 2001;51:325-33.
8. Alvarez JA, Rezende KM, Salazar Marocho SM, Alves F , Celiberti P , Ciamponi AL. Dental fluorosis: Exposure, prevention and management. Med Oral Patol Oral Cir Bucal. 2009 Feb 1;14(2):E103-7.
9. Alothman, Y. A., & Al-Madi, E. M. (2018). Aesthetic management of dental fluorosis with ceramic veneers: A case report. Case Reports in Dentistry, 2018, Article ID 4063165. https://doi.org/ 10.1155/2018/4063165
10. Parinitha MS, Annapoorna BM, Tejaswi S, Shetty S, Sowmya HK. Effect of power bleaching on the fluorosis stained anterior teeth case series. J Clin Diagn Res. 2014;8:J01-3
11. Pardeshi AA, Gade RM. Aesthetic management of dental fluorosis using ceramic veneers: A case report. Int J Appl Dent Sci. 2023;9(4):95–98.
12. Gurel G, Morimoto S, Calamita MA, Coachman C, Sesma N. Clinical performance of porcelain laminate veneers: Outcomes of the aesthetic pre- evaluative temporary (APT) technique. Int. J Periodontics Restor. Dent. 2012;32:625-35
13. Morimoto S, Albanesi RB, Sesma N, Agra CM, Braga MM. Main clinical outcomes of feldspathic porcelain and glass-ceramic laminate veneers: a systematic review and meta-analysis of survival and complication rates. Int J Prosthodont. 2016;29:38-49
14. Kruetongsri K, Leevailoj C. Treatment of moderate dental fluorosis using porcelain laminate veneers: A case report. Chulalongkorn Univ Dent. 2013;J 35(1):49-64
15. Demirekin ZB, Turkaslan S. Laminate veneer ceramics in aesthetic rehabilitation of teeth with fluorosis: a 10-year follow-up study. BMC Oral Health. 2022;22:1-8
16. Weerasinghe, D.S.; Nikaido, T.; Wettasinghe, K.A.; Abayakoon, J.B.; Tagami, J. Micro-shear bond strength and morphological analysis of a self- etching primer adhesive system to fluorosed enamel. J. Dent. 2005, 33, 419–426