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Conservative Management of Posterior Dental Fluorosis and Wear Facets Using Overlays and Crowns: A Case Report

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ABSTRACT

Dental fluorosis and occlusal wear present a restorative challenge, particularly when they coexist in posterior teeth. The present case report describes the prosthetic rehabilitation of a 34-year-old female patient who presented with sensitivity and discoloration in posterior teeth due to moderate fluorosis and generalized wear facets. Clinical evaluation revealed a reduced vertical dimension, and a treatment plan involving a combination of overlays and full-coverage crowns was devised to restore function and esthetics conservatively. Overlays were employed where enamel preservation was possible, and crowns were limited to severely affected or RCT-treated teeth. Final restorations were fabricated in monolithic zirconia and bonded using adhesive cement. Post-operative results demonstrated functional stability, esthetic satisfaction, and resolution of sensitivity. This case emphasizes the effectiveness of minimally invasive prosthodontics in managing complex conditions involving fluorosis and attrition.

Keywords: *Dental fluorosis, occlusal wear, overlays, vertical dimension, conservative dentistry*

1. INTRODUCTION

Dental fluorosis and occlusal wear are common conditions that significantly affect both function and esthetics [1,2]. Fluorosis results from excessive systemic fluoride intake during enamel formation and presents as intrinsic enamel discoloration ranging from mild opacities to severe pitting and brown stains [1]. While the aesthetic concern is often the primary complaint in anterior teeth, posterior teeth affected by fluorosis can also pose functional and restorative challenges, especially when compounded by occlusal wear facets. Wear facets, typically caused by parafunctional habits or altered occlusal dynamics, lead to the progressive loss of enamel and dentin, sensitivity, and reduced vertical dimension of occlusion. Managing such cases requires a thoughtful balance between esthetic rehabilitation, occlusal reconstruction, and preservation of natural tooth structure.

Traditionally, full-coverage crowns have been the go-to treatment modality in cases of moderate to severe fluorosis or extensive wear, as they offer predictable results and comprehensive coverage [3]. However, this approach is highly invasive, involving substantial tooth preparation that can further weaken already compromised dental structures. Moreover, when resin-based techniques such as microabrasion, composite veneers, or resin infiltration are used alone to treat fluorosis, long-term esthetic stability can be compromised due to staining and wear [4]. These methods also fail to address the functional component when wear facets are present.

In contemporary prosthodontics, a conservative alternative to full crowns is the use of overlays, which are partial coverage restorations that provide esthetic and functional rehabilitation with minimal tooth reduction [5]. Overlays are particularly suitable for posterior teeth with localized wear and fluorotic changes, allowing for the restoration of occlusal anatomy and vertical dimension while preserving sound tooth structure. The present case report describes a conservative treatment approach using a combination of overlays and full crowns in a patient with generalized posterior fluorosis and wear facets.

2. CASE REPORT

A 34-year-old female patient was referred to the Department of Prosthodontics at D.Y. Patil University School of Dentistry with the chief complaint of generalized sensitivity in the back teeth and dissatisfaction with the esthetics of her posterior dentition. The patient reported difficulty while consuming hot and cold beverages and expressed concern about the brownish discoloration on her molars and premolars, which affected her confidence during smiling and speaking.

Clinical Examination

Intraoral examination revealed multiple posterior teeth exhibiting loss of translucency, and pitting consistent with dental fluorosis. In addition, occlusal wear facets were observed bilaterally on both maxillary and mandibular arches, indicative of chronic attrition. These were most prominent in the molars and premolars. No signs of active caries or periodontal disease were present. Teeth 36 and 46 were endodontically treated, and a metal-ceramic prosthesis was present on tooth 46. The pre-operative intraoral photographs are presented in Figure 1.

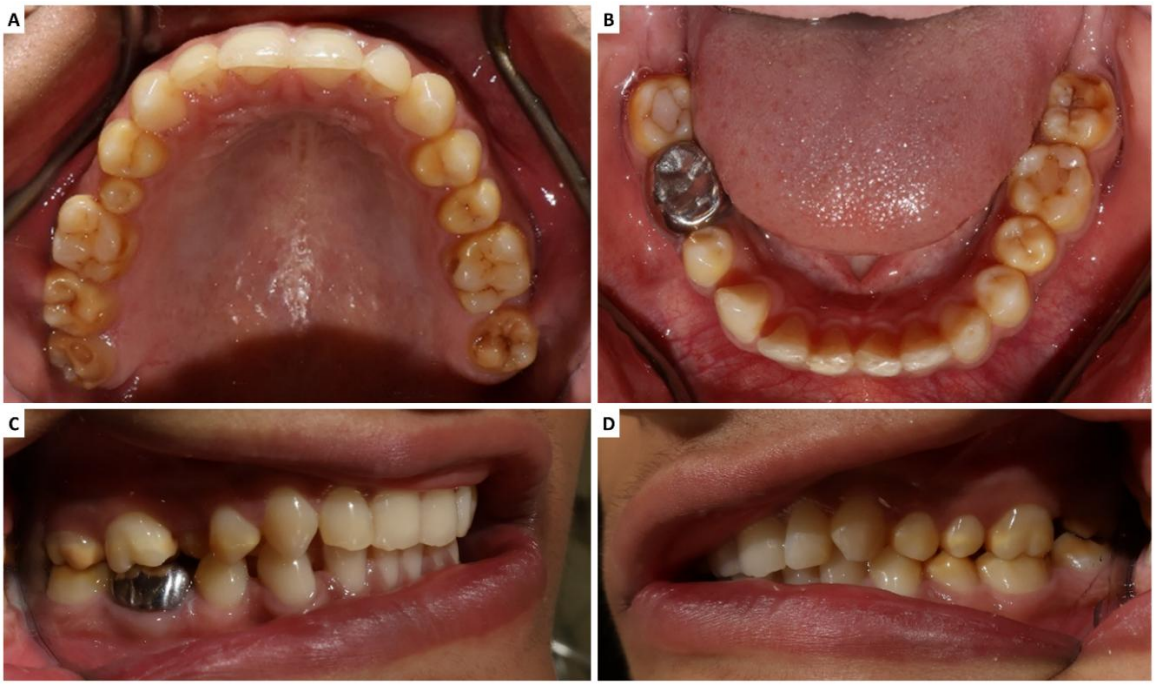

Figure 1: Pre-operative intraoral photographs – A) Maxillary Occlusal View, B) Mandibular Occlusal View, C) Right Lateral View, D) Left Lateral View

Diagnosis and Treatment Planning

Based on the clinical findings, a diagnosis of mild dental fluorosis. A comprehensive treatment plan aimed at functional rehabilitation and esthetic enhancement was formulated. Given the extent of enamel damage, tooth sensitivity, full-mouth rehabilitation of the posterior teeth was planned. However, to maintain a conservative approach, a combination of full crowns and partial coverage overlays was proposed. Overlays were chosen for teeth where the damage was localized and enamel structure allowed for minimal preparation, thereby avoiding unnecessary tooth reduction.

Procedure

A diagnostic impression was made using addition silicone (polyvinyl siloxane) material, and casts were poured with high-strength dental stone. Facebow transfer and centric relation records were obtained for accurate articulation and occlusal analysis. Tooth preparation was carried out in accordance with the restorative plan (Figure 2). Full-coverage crown preparations were done on teeth 14, 15, 16, 17, 25, 36, 37, and 47, primarily where the wear was extensive, RCT had been performed, or where structural support was inadequate.

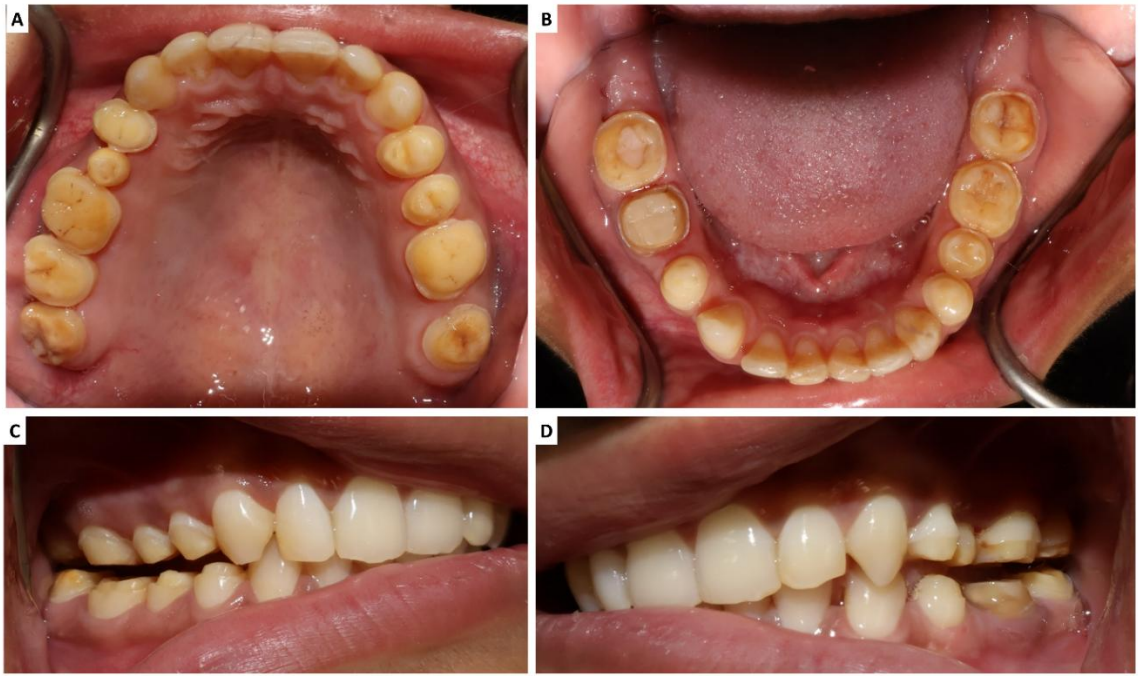

Figure 2: Intraoral photographs after tooth preparation – A) Maxillary Occlusal View, B) Mandibular Occlusal View, C) Right Lateral View, D) Left Lateral View

Final impression of the dentitions after preparation of teeth was performed using putty wash technique (Figure 3). Overlay preparations were carried out on teeth 24, 26, 27, 35, 44, 45, and 46. Overlay restorations were indicated on these teeth due to localized wear facets and mild fluorotic involvement, allowing the preservation of substantial enamel structure.

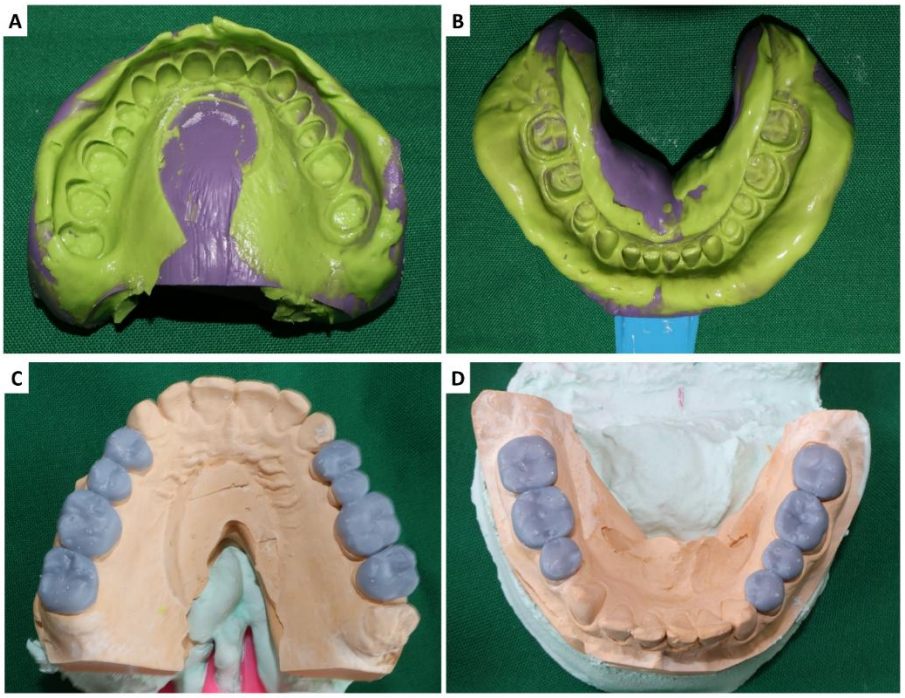

Figure 3: Final impressions of A) Maxillary arch and B) Mandibular arch; Extraoral resin trial on A) Maxillary cast and B) Mandibular cast

Provisional restorations were fabricated and luted using non-eugenol temporary cement (Figure 4). The patient was instructed to evaluate function, esthetics, phonetics, and comfort over a trial period. No signs of discomfort or temporomandibular joint issues were reported during this phase. A resin mock-up trial was then conducted to further refine occlusion and esthetic contours. Necessary corrections were made based on functional evaluation and patient feedback.

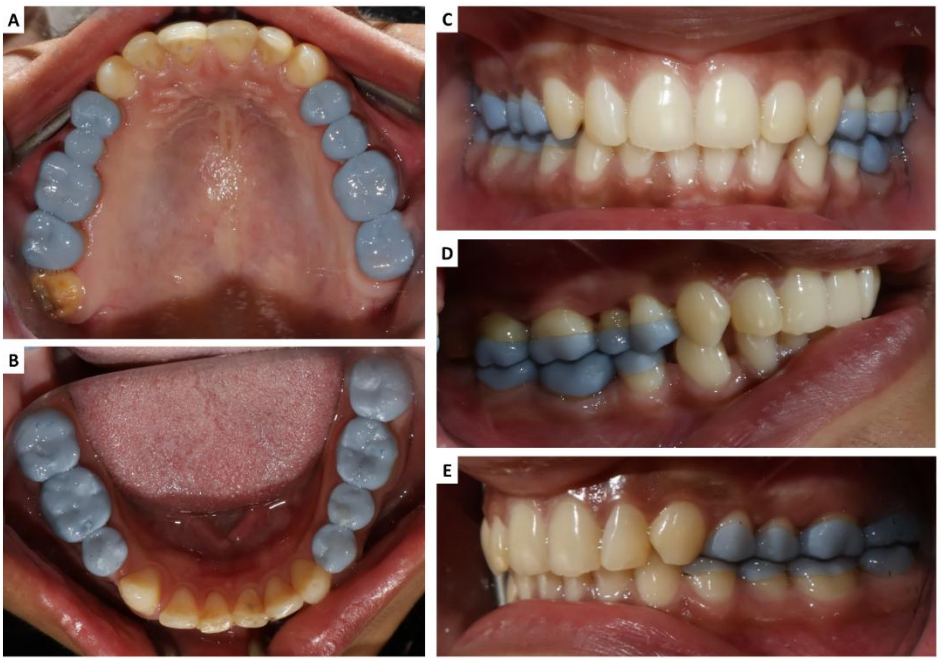

Figure 4: Intraoral photographs during resin trial – A) Maxillary Occlusal View, B) Mandibular Occlusal View; Teeth in occlusion C) Front View, D) Right Lateral View, D) Left Lateral View

Final restorations were fabricated in monolithic zirconia due to its superior mechanical strength, biocompatibility, and color-matching ability. Each prosthesis was individually assessed and tried intraorally to ensure marginal integrity, occlusion, and esthetics. After necessary minor adjustments, final bonding was performed using adhesive resin cement under rubber dam isolation where applicable. Occlusion was verified in both static and dynamic movements and was found to be stable. The final cemented prosthesis are depicted in Figure 5.

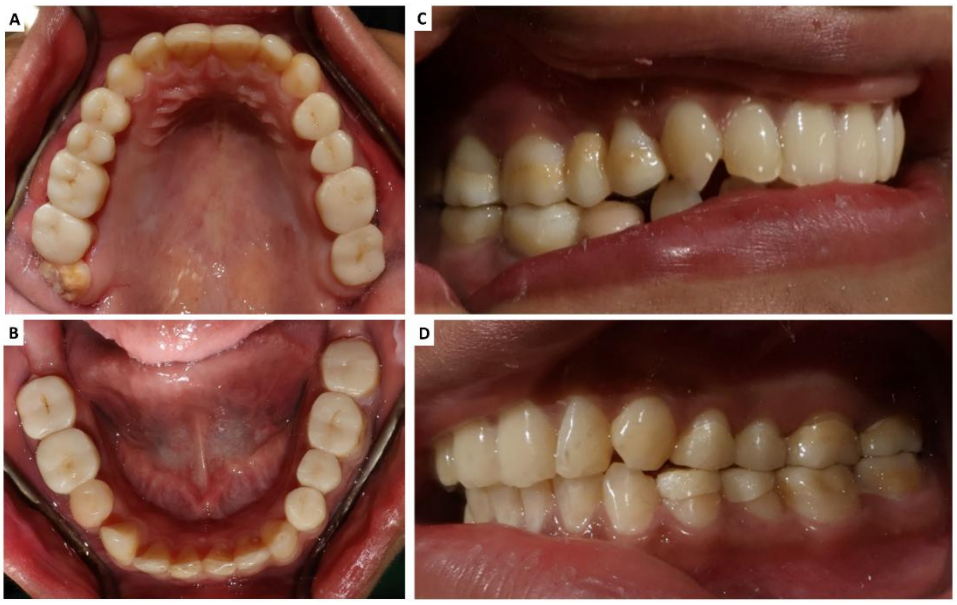

Figure 5: Intraoral photographs after cementation of final prosthesis – A) Maxillary Occlusal View, B) Mandibular Occlusal View, C) Right Lateral View, D) Left Lateral View

Post-Operative Care

The patient was given post-operative instructions including guidance on maintaining oral hygiene with the new prostheses, dietary advice to avoid excessive forces on the restorations, and the use of a night guard to prevent parafunctional wear. Regular follow-up visits were scheduled at one week, one month, and three months. At each follow-up, the restorations remained intact, with no signs of debonding, sensitivity, or occlusal disharmony. The patient expressed satisfaction with the esthetic outcome and reported significant improvement in masticatory efficiency and comfort.

3. DISCUSSION

The present case posed a peculiar clinical scenario involving the coexistence of posterior dental fluorosis and occlusal wear, a combination that often complicates both diagnosis and restorative planning. While the patient's chief complaints were sensitivity and dissatisfaction with the appearance of her back teeth, it became evident upon clinical evaluation that the underlying issues extended beyond esthetics. These factors, combined with the intrinsic enamel defects from fluorosis, demanded a carefully considered treatment strategy [2].

In our clinical experience, patients with posterior fluorosis often remain undiagnosed or untreated for extended periods, especially when discoloration is less visible or masked by posterior positioning. However, the weakened enamel structure can make these teeth more susceptible to breakdown, particularly when exposed to occlusal forces over time [6]. The patient's sensitivity further indicated exposed dentin or microfractures within the enamel layer, making timely intervention critical.

Instead of immediately resorting to full crowns on all affected teeth, which was a conventional but invasive approach tailored to balance tooth preservation with the need for durable, long-term rehabilitation. Overlays were chosen for several posterior teeth where the fluorotic lesions and wear were moderate, and the enamel could be preserved. This approach significantly reduced the extent of tooth preparation, maintaining pulp vitality and allowing the patient to retain more of her natural tooth structure. Full crowns were reserved for teeth that were endodontically treated or showed severe fluorosis-related breakdown.

The choice of monolithic zirconia for both crowns and overlays was supported by the high functional demands of the posterior dentition and the patient's esthetic concerns. The material offers strength, longevity, and improved esthetics over traditional metal-ceramic options [10]. Moreover, bonding zirconia restorations with adhesive cement ensures additional retention and marginal seal, essential for long-term success [11].

Importantly, the patient was actively involved throughout the treatment. From evaluating temporary restorations to participating in the resin trial, her feedback played a pivotal role in refining occlusion and esthetic contours. Post-operative reviews confirmed functional stability, resolution of sensitivity, and high patient satisfaction. Her improved comfort during mastication and renewed confidence in smiling reflected the holistic success of the treatment. Overall, the treatment plan in the present case reinforces the value of individualized treatment planning by selectively incorporating overlays and reserving full crowns as and when necessary. It enables restoration of the function and esthetics for the patient in a minimally invasive manner. Such an approach aligns well with the current shift in prosthodontics toward conservative yet comprehensive care.

4. CONCLUSION

The present case highlights the successful application of a conservative restorative approach using overlays and full crowns to rehabilitate posterior teeth affected by dental fluorosis and occlusal wear. By prioritizing enamel preservation, functional restoration, and esthetic improvement, we achieved a predictable and minimally invasive outcome. The combination of overlays for moderately affected teeth and crowns for severely compromised or endodontically treated teeth allowed tailored management of each quadrant. This approach not only restored vertical dimension and eliminated sensitivity but also reinforced the importance of individualized treatment planning in modern prosthodontics.

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