

"Rehabilitation of Failed Maxillary Posterior Prosthesis with Surgical Crown lengthening and Prosthetic Reconstruction"

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Abstract

A 55-year-old male patient presented to the Department of Periodontology at IDST, Modinagar, with a chief complaint of sensitivity and mild pain in the left upper back teeth region for the past three months. The patient had a four-unit porcelain-fused-to-metal (PFM) prosthesis in the upper left posterior region fabricated one year prior by a local dentist. The prosthesis had dislodged multiple times and was repeatedly re-luted by the same dentist. A comprehensive treatment plan was devised, involving the removal of the faulty prosthesis, periodontal treatment, and the fabrication of a new zirconia crowns. Additionally, a mandibular five-unit crown was planned to maintain the curve of Spee. The final outcome showed a successful rehabilitation with good post-operative prognosis.

Keywords: Periodontology, porcelain-fused-to-metal, periodontal inflammation, zirconia crowns

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Introduction

Fixed dental prostheses are commonly used to restore function and aesthetics in partially edentulous patients. However, improper planning and execution can lead to complications such as prosthesis failure, periodontal issues, and occlusal imbalance. Fixed dental prostheses, such as porcelain-fused-to-metal (PFM) crowns, are widely utilized to restore function, aesthetics, and comfort in patients with partially edentulous arches. However, the success of these restorations depends significantly on careful planning, precise execution, and regular maintenance.¹ Poorly designed or ill-fitting prostheses can lead to a variety of complications, including prosthesis dislodgement, periodontal inflammation, and occlusal disharmony, which may ultimately compromise the longevity of the restoration and the overall oral health of the patient.²

Prosthetic failure is often linked to factors such as inadequate crown-to-root ratios, improper occlusal

design, and poor periodontal health.³ A well-planned and executed interdisciplinary approach involving both prosthodontic and periodontal treatments is essential for managing these complications and ensuring a successful rehabilitation. In particular, procedures like crown lengthening can play a crucial role in improving the crown-to-root ratio, thereby enhancing the stability of the prosthesis and preventing further periodontal damage.⁴ This case report details the interdisciplinary management of a patient with a failed four-unit PFM prosthesis in the maxillary posterior region. The treatment involved the removal of the faulty prosthesis, periodontal therapy including crown lengthening, and the fabrication of a new zirconia crowns, along with mandibular rehabilitation to maintain the curve of Spee. This comprehensive approach highlights the importance of restoring both function, aesthetics collaboration and careful treatment planning.

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Case Presentation

Patient History: A 55-year-old male reported with a chief complaint of sensitivity and mild pain in the left upper back teeth region for three months. The patient had undergone fabrication of a four-unit porcelain-fused-to-metal (PFM) fixed dental prosthesis one year earlier, replacing teeth #24–27. According to the patient's history, the prosthesis had become dislodged on at least four occasions during the preceding year and was re-cemented each time by the same clinician.

An intraoral examination revealed a fractured and poorly fitting prosthesis (Figure 1). The surrounding gingiva showed signs of localized inflammation, particularly due to the ridge-lap pontic design in the posterior region, which had caused tissue damage (Figure 2, A,B). A comprehensive periodontal evaluation revealed probing pocket depths of 3–4 mm and an adequate width of attached gingiva (4–7 mm) on the labial aspect of teeth #24, #25, #26, and #27. No mobility was detected in these teeth. Considering the unfavorable crown-to-root ratio, inadequate biologic width, and the presence of thick connective tissue attachment on the palatal aspect, an apically positioned flap (APF) with submarginal incisions was planned for surgical crown lengthening. A 1-mm submarginal incision was placed on the labial aspect and a 2-mm submarginal incision on the palatal aspect. Following flap elevation, osteotomy and osteoplasty were performed as required to re-establish

the biologic width and achieve adequate clinical crown length for subsequent prosthetic rehabilitation (Figure 3A–K).

Following periodontal treatment, new core build-ups were placed on teeth 24, 25, and 27. After a healing period of two months, tooth preparation was done for teeth 24, 25, and 27, and a final impression was made. A four-unit zirconia crown was fabricated for the maxillary second quadrant (teeth 24, 25, 26, and 27). The prosthesis was luted using resin cement (Illusion Laboratory, Mumbai). (Figure 4)

To maintain the curve of Spee between the maxillary and mandibular arches, a five-unit prosthesis was planned for the mandibular left posterior region (teeth 34, 35, 36, 37, and 38), with 36 and 37 as pontics. A metal try-in of both the maxillary and mandibular prosthesis was done simultaneously to ensure adequate clearance. Temporization was done before placement of final prosthesis. The occlusion was corrected and final prosthetic rehabilitation was done using resin cement (3M ESPE). (Figure 4)

The post-operative evaluation showed good healing and stability of both the maxillary and mandibular prostheses. The patient reported no further sensitivity or pain, and the gingival inflammation had subsided. The final outcome was satisfactory, with proper occlusal balance and an overall good prognosis. (Figure 5)



Figure 1: Pre-operative intraoral picture

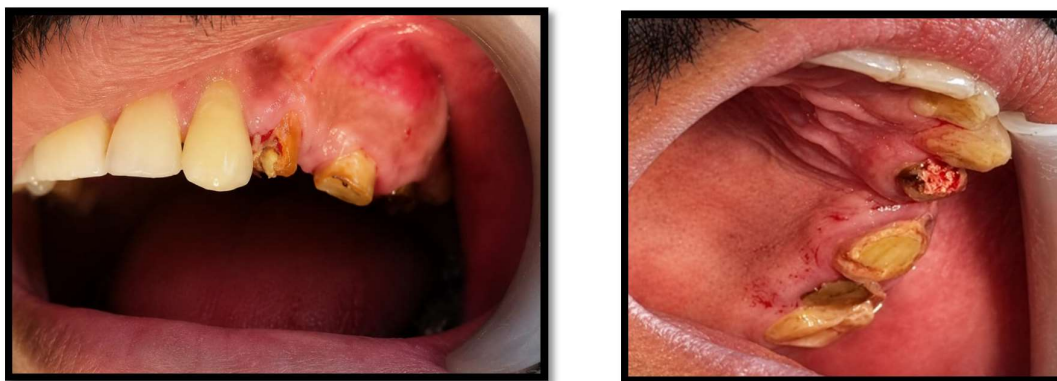


Figure 2: After removal of the prosthesis, poor condition of teeth wrt 24, 25

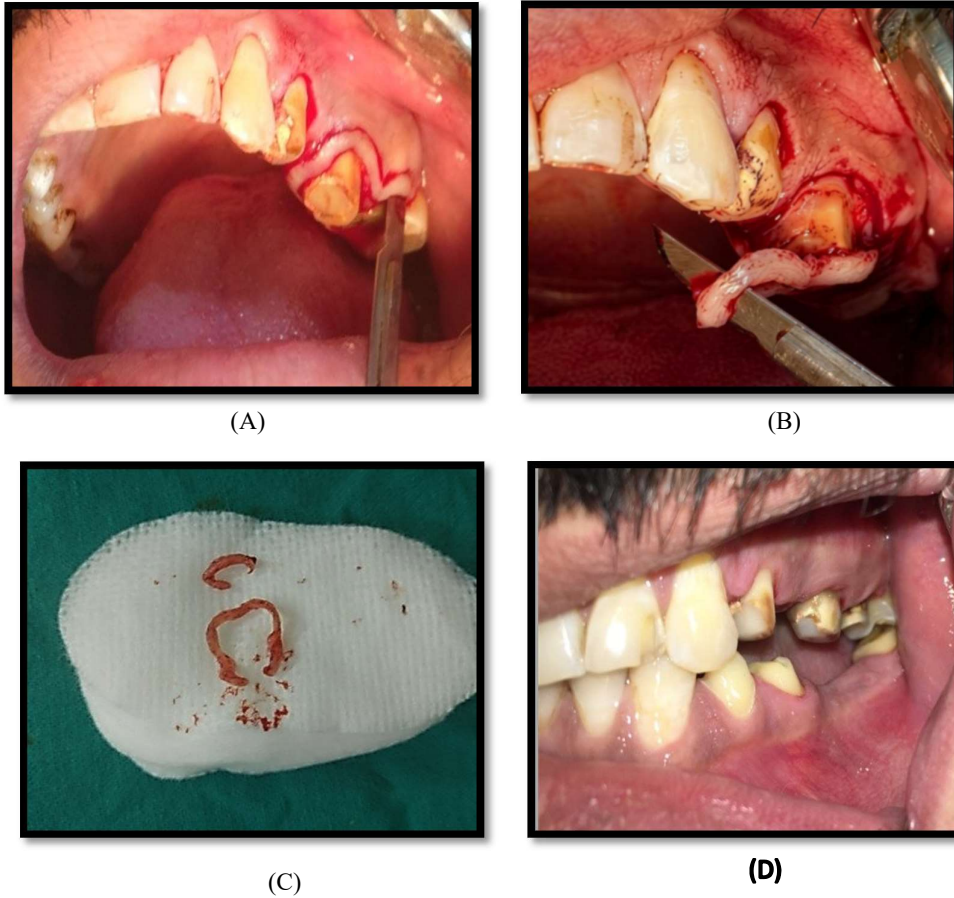


Figure 3 (A) TO (D): Crown Lengthening

(A): 1 mm Submarginal Incision being measured through a probe on the buccal and palatal side extending distal to second molar (27)

(B): Removal of a band of tissue of 1mm thickness buccally and palatally from the marginal gingival wrt 24, 25, 26.

(C): Band of tissue of 1 mm thickness from the marginal gingival wrt 24, 25, 26.

(D): 2- Months– Post Operative Follow Up



Figure 4: Zirconia Prosthesis wrt 24, 25, 26 and 27 and 34, 35, 36, 37 and 38.



Figure 5: Final luted prosthesis wrt maxillary and mandibular arches

Discussion

This case underscores the importance of proper diagnosis, interdisciplinary collaboration, and meticulous treatment planning in the rehabilitation of failed dental prostheses. The decision to remove the faulty PFM crowns, perform crown lengthening, and fabricate a new zirconia crown resulted in a successful restoration of function and aesthetics. Additionally, the inclusion of a mandibular crown to maintain the curve of Spee ensured long-term occlusal stability. The management of failed fixed dental prostheses, particularly in the posterior maxillary region, presents a unique set of challenges that require a multidisciplinary approach. The present case underscores the importance of proper diagnosis, careful treatment planning, and the integration of both periodontal and prosthodontic interventions to achieve successful outcomes.⁵ One of the key issues in this case was the repeated dislodgement of the porcelain-fused-to-metal (PFM) crown, which was likely due to several factors including improper tooth preparation, inadequate retention, and occlusal design. Research has shown that the retention and resistance of a fixed prosthesis are highly dependent on factors such as the height and taper of the prepared tooth, the surface area available for bonding, and the quality of the cement used. In this case, the repeated failures suggested that these critical factors were not adequately addressed during the initial treatment, leading to the eventual failure of the prosthesis.^{5,6}

The presence of gingival inflammation around the failed prosthesis further highlighted the need for a comprehensive periodontal assessment. Inadequate crown-to-root ratios, combined with poorly designed pontics, can contribute to periodontal disease by creating areas that are difficult to clean and maintain. The ridge-lap design of the pontic in this case likely exacerbated the issue by impinging on the underlying soft tissue, leading to inflammation and tissue damage. Periodontal interventions, including crown lengthening, were necessary to correct the crown-to-root ratio and create a healthier environment for the new prosthesis.^{6,7}

Crown lengthening is a surgical procedure that can improve the retention of a prosthesis by increasing the

available surface area for bonding and ensuring an adequate biological width. In this case, the crown lengthening procedure was critical in improving the crown-to-root ratio of the involved teeth, thereby enhancing the stability of the new zirconia crown. The use of a zirconia crown was a strategic choice due to its superior strength, aesthetics, and biocompatibility compared to traditional PFM restorations.^{8,9}

The mandibular rehabilitation was also a crucial component of the treatment plan. Maintaining the curve of Spee is essential for proper occlusal function and long-term stability of the prosthetic work. By designing a five-unit crown in the mandibular posterior region, with appropriate occlusal clearance and pontic design, the treatment team was able to restore both function and aesthetics while ensuring that the occlusal forces were evenly distributed across the arches.^{10,11,12} The successful outcome of this case, characterized by the elimination of pain, resolution of gingival

inflammation, and the restoration of proper function and aesthetics, underscores the importance of an interdisciplinary approach in prosthodontics. By addressing both the periodontal and prosthetic aspects of the case, the treatment team was able to provide a long-term solution that not only resolved the patient's immediate concerns but also improved the overall health and stability of the oral environment.

Conclusion

The rehabilitation of a failed PFM crown in the maxillary posterior region, coupled with periodontal treatment and full mouth rehabilitation, can yield excellent outcomes when managed with a comprehensive and interdisciplinary approach. The patient's symptoms were alleviated, and the prognosis was positive, demonstrating the effectiveness of the treatment plan.

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