

CASE REPORT

Posterior mandibular tooth replacement using a porcelain-fused-to-metal adhesive bridge with sanitary and conical pontic designs: A case report

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ABSTRACT

Posterior mandibular tooth loss can significantly impair masticatory function, occlusal stability, and overall quality of life. Among available treatment options, adhesive bridges offer a minimally invasive alternative that preserves tooth structure while restoring function. This case report describes posterior mandibular tooth replacement using a porcelain-fused-to-metal (PFM) adhesive bridge incorporating two different pontic designs, namely sanitary and conical pontics. A 50-year-old female patient presented with missing posterior mandibular teeth and complaints of discomfort during mastication. Clinical examination revealed a Kennedy Class III modification 1 condition with favorable abutment support. A conservative treatment plan was developed using a resin-bonded fixed dental prosthesis. Tooth preparation was performed within enamel, followed by impression procedures and laboratory fabrication. The pontic design was selected based on anatomical and hygienic considerations, with a sanitary pontic applied in one region and a conical pontic in another. Following coping try-in and evaluation of marginal fit and occlusion, final cementation was performed using dual-cure resin cement. Post-insertion evaluation demonstrated satisfactory function, stability, and esthetics, with good periodontal response. This case highlights that appropriate pontic design selection plays a crucial role in achieving functional efficiency, hygiene maintenance, and long-term success in adhesive bridge restorations. (IJP 2025;7(1):82-86)

Keywords: Adhesive bridge, Conical pontic, Minimally invasive dentistry, Porcelain-fused-to-metal, Posterior mandible, Sanitary pontic

Introduction

Tooth loss remains a prevalent oral health condition that significantly affects mastication, esthetics, and overall quality of life. Posterior mandibular tooth loss, in particular, reduces masticatory efficiency and occlusal stability and may lead to migration of adjacent teeth and supraeruption of opposing teeth if left untreated.^{1,2}

Prolonged tooth loss may also result in alterations in occlusal relationships and temporomandibular joint function.¹ Therefore, appropriate prosthodontic rehabilitation is essential to restore function and prevent further complications. Early intervention is important to minimize progressive functional impairment and maintain occlusal harmony.

According to Kennedy classification, posterior edentulous areas bounded by natural teeth are categorized as Class III, which generally presents a favorable prognosis due to adequate abutment support. This condition allows for predictable load distribution and enhances the stability of fixed prosthetic restorations, making it suitable for adhesive bridge treatment.^{3,4}

Various treatment options are available, including removable partial dentures, dental implants, and fixed dental prostheses. However, each modality presents limitations such as patient discomfort, surgical requirements, cost, or extensive tooth preparation.^{5,6} Therefore, treatment selection should be based on clinical conditions, patient preferences, and long-term prognosis.

Resin-bonded fixed dental prostheses, also known as adhesive bridges, offer a minimally invasive alternative because preparation is confined mainly to enamel, preserving tooth structure while providing adequate retention. This approach is particularly beneficial in cases where conservation of tooth structure is a primary concern.^{7,8}

Pontic design is a critical determinant of the biological and functional success of fixed dental prostheses. The sanitary pontic is commonly indicated in posterior regions due to its complete clearance from the residual ridge, allowing excellent hygiene maintenance and reducing the risk of plaque accumulation. In contrast, the conical pontic presents a convex surface with minimal contact at the center of the ridge, providing a balance between hygiene and esthetic contour.⁶ The selection between these pontic designs should be based on ridge anatomy, esthetic demand, and patient oral hygiene capability.

Porcelain-fused-to-metal (PFM) remains a widely used material in fixed prosthodontics due to its favorable mechanical strength and durability, especially in posterior regions subjected to high occlusal loads. In addition, PFM restorations provide a combination of strength and acceptable esthetics, making them suitable for long-term clinical use in load-bearing areas.^{9,10}

This case report aims to describe posterior mandibular

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tooth replacement using a PFM adhesive bridge with sanitary and conical pontic designs, emphasizing the role of pontic selection in optimizing function, hygiene, and long-term prognosis. The selection of pontic design is essential balance between biological compatibility and functional efficiency.

facial profile, normal temporomandibular joint function, and good oral hygiene. Intraoral examination showed edge-to-edge occlusion with overbite and overjet of 4 mm. Radiographic findings confirmed missing posterior mandibular teeth with adequate abutment support. The condition was diagnosed as Kennedy Class III modification 1 [figure 2](#).

A treatment plan was developed using a porcelain-fused-to-metal (PFM) adhesive bridge. Pontic design selection was based on anatomical and hygienic considerations. A sanitary pontic was applied in one posterior region to facilitate cleaning and minimize tissue contact, while a conical pontic was used in another region to provide improved contour and acceptable hygiene access. Tooth preparation was performed conservatively within enamel with a depth of approximately 0.3–0.5 mm using a wrap-around design extending approximately 180° to increase bonding surface area. Supragingival chamfer margins were created to facilitate plaque control and reduce periodontal irritation. Occlusal rests were prepared to enhance support and prevent rotational movement [figure 3](#).

Impression procedures were carried out using polyvinyl siloxane material, followed by fabrication of the restoration. Shade selection was performed using the VITA Classical Shade Guide, resulting in shade C3. The selected shade was considered compatible with the adjacent dentition to achieve a harmonious esthetic outcome [figure 4](#).

Coping try-in demonstrated satisfactory marginal adaptation, proper seating, and stability. Occlusion was evaluated in both static and dynamic conditions to eliminate premature contacts and interferences. Final restoration try-in confirmed appropriate contour, esthetics, and adaptation, with no evidence of marginal discrepancy or instability. The prosthesis was able to be inserted along the planned path of insertion and remained fully seated without resistance, indicating adequate fit and retention prior to cementation [figure 5](#).

Prior to cementation, the abutment teeth were cleaned with pumice. The intaglio surface of the metal retainer was treated with sandblasting and metal primer. Enamel surfaces were etched with 37% phosphoric acid, followed by bonding agent application. The prosthesis was cemented using dual-cure resin cement, and excess cement was removed. Final occlusal adjustments were performed to ensure proper load distribution.

Follow-up evaluations at one week and one month demonstrated stable restoration, healthy periodontal tissues, and satisfactory patient comfort. Occlusal evaluation in both static and dynamic conditions revealed no premature contacts or interferences. No signs of debonding or marginal discrepancy were observed, and the patient reported improved masticatory function. Oral hygiene around the prosthesis was well maintained, and the patient was instructed to continue regular follow-up for long-term evaluation.



Figure 1. Intraoral Photographs of the Patient: A. Right Lateral View, B. Occlusion, C. Left Lateral View, D. Maxillary Occlusal View, E. Mandibular Occlusal View.

Case Report

A 50-year-old female patient presented with missing posterior mandibular teeth, complaining of discomfort during mastication and difficulty chewing, particularly when consuming harder foods. The patient had previously used a removable partial denture but discontinued its use due to discomfort and poor adaptation. She expressed a preference for a fixed prosthetic solution with minimal tooth reduction. The patient reported that the teeth had been missing for approximately 15 years following extraction due to extensive caries. No complications were reported during healing, and no definitive prosthetic rehabilitation had been performed since then. Medical history was non-contributory [figure 1](#).

Clinical examination revealed a symmetrical



Figure 2. Panoramic Radiograph of the Patient.

Discussion

Posterior mandibular tooth loss significantly affects masticatory function and occlusal stability, and if not rehabilitated properly, may lead to occlusal imbalance and functional disturbances.

In this case, the condition was classified as Kennedy Class III modification,¹ which provides favorable support for fixed prosthetic treatment due to the presence of abutment teeth on both sides of the edentulous space.^{3,11}

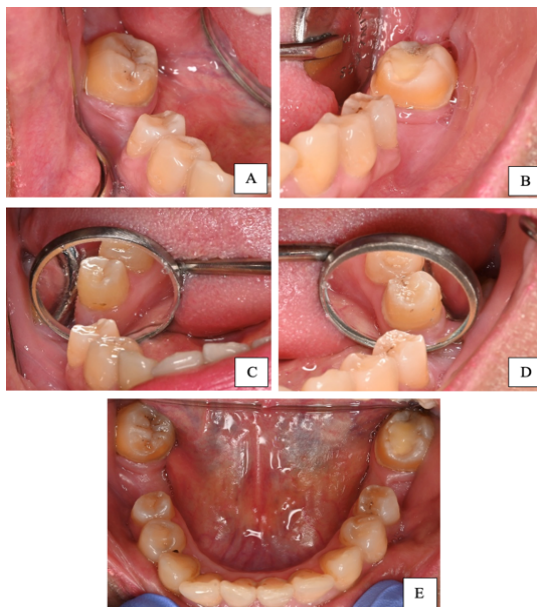


Figure 3. Abutment Tooth Preparation for Adhesive Bridge: A. Tooth 47, B. Tooth 37, C. Tooth 45, D. Tooth 35, E. Mandibular Occlusal View.

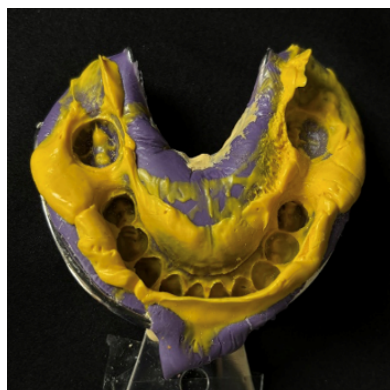


Figure 4. Two-Step Impression Technique Using Polyvinyl Siloxane.

The use of an adhesive bridge allows a conservative approach, preserving tooth structure while restoring function. Resin-bonded prostheses rely on both chemical adhesion and mechanical design to achieve retention and stability. This approach enhances the preservation of enamel, which is essential for achieving optimal bonding strength.⁷

Pontic design plays a crucial role in both biological and mechanical success. The sanitary pontic, which does not contact the underlying ridge, provides superior hygiene by eliminating plaque-retentive areas and reducing the risk of soft tissue inflammation. This design is particularly suitable for posterior regions where esthetic demands are lower.⁶

In contrast, the conical pontic provides a convex surface with minimal ridge contact, offering improved esthetic contour compared to sanitary pontics while still allowing relatively easy cleaning. However, improper adaptation or excessive contact may increase plaque accumulation if oral hygiene is inadequate.⁶

The combination of sanitary and conical pontic designs in this case allowed optimization of treatment outcomes. The sanitary pontic was selected in areas prioritizing hygiene, whereas the conical pontic was used in regions requiring better contour adaptation. This selective approach demonstrates that pontic design should be individualized rather than standardized.⁶

In this case, one of the abutment teeth (tooth 37) presented with a composite restoration. The presence of a composite restoration is not a contraindication for adhesive bridge placement, provided that the restoration is clinically sound and well-bonded. Composite restorations have demonstrated satisfactory longevity and bonding performance when appropriate adhesive protocols are followed.¹² Therefore, the use of tooth 37 as an abutment was considered clinically acceptable and did not adversely affect the prognosis of the restoration.

PFM material was selected due to its high

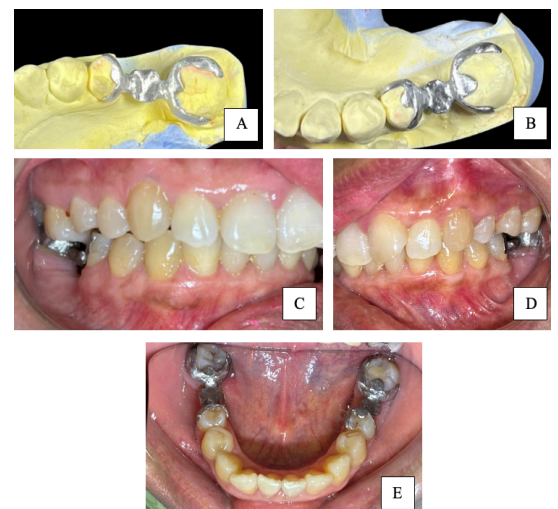


Figure 5. Coping Try-In of the Adhesive Bridge: A. Coping in the Region of Tooth 46, B. Coping in the Region of Tooth 36, C. Occlusion in the Region of Tooth 46, D. Occlusion in the Region of Tooth 36, E. Mandibular Occlusal View.

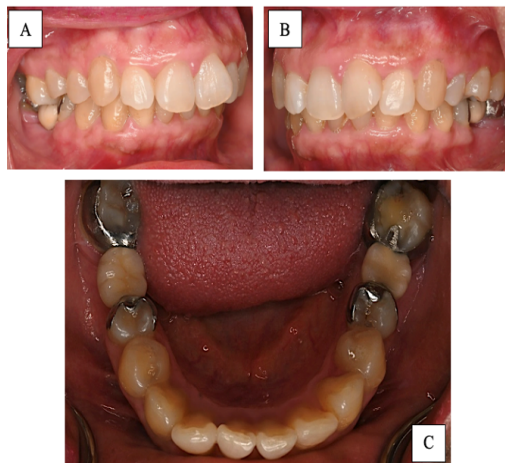


Figure 6. Insertion and Cementation of the Adhesive Bridge: A. Occlusion in the Region of Tooth 46, B. Occlusion in the Region of Tooth 36, C. Mandibular Occlusal View.

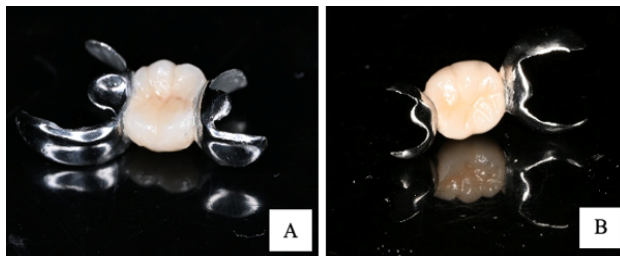


Figure 7. Porcelain-Fused-to-Metal (PFM) Adhesive Bridge: A. Region of Tooth 36, B. Region of Tooth 46.

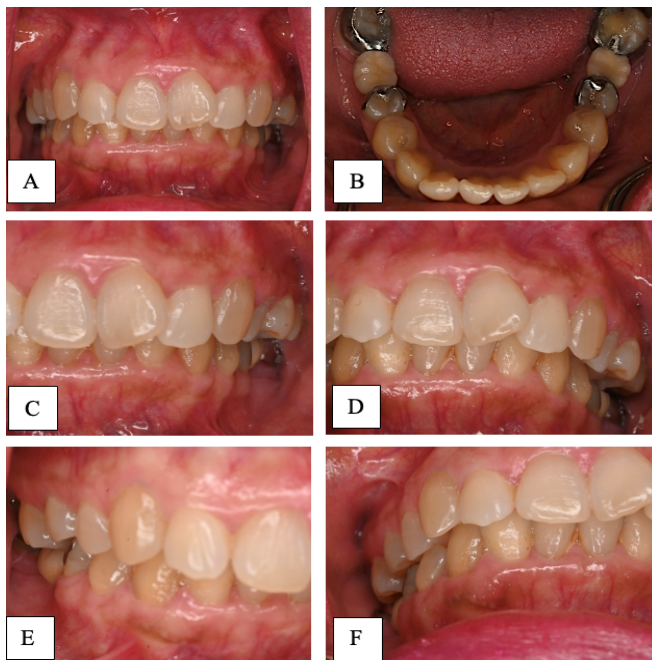


Figure 8. Post-Insertion Follow-Up of the Adhesive Bridge: A. Frontal View, B. Mandibular Occlusal View, C. Occlusion in the Region of Tooth 36, D. Inferior Intraoral View of Tooth 36 Region, E. Occlusion in the Region of Tooth 46, F. Inferior Intraoral View of Tooth 46 Region.

mechanical strength and long-term clinical success in posterior regions. Dual-cure resin cement provides reliable polymerization and strong adhesion, particularly in metal-based restorations, ensuring optimal bonding even in areas with limited light penetration. This improved retention and overall longevity of the restoration.^{9,13}

Post-insertion evaluation demonstrated satisfactory adaptation, stability, and periodontal health, with no signs of debonding or complications. Regular follow-up remains essential, as adhesive bridge failure is most commonly associated with debonding.¹⁴ Overall, this case highlights that the success of adhesive bridge restorations is influenced not only by adhesive protocols but also significantly by appropriate pontic design selection and abutment condition.

Conclusion

The use of a porcelain-fused-to-metal adhesive bridge incorporating sanitary and conical pontic designs represents an effective and conservative approach for posterior mandibular tooth replacement. Differences in pontic design play an important role in determining hygiene maintenance, tissue response, and functional performance. The sanitary pontic provides superior hygiene due to the absence of ridge contact, while the conical pontic offers a balance between esthetics and cleanability. Proper selection and combination of pontic designs, along with appropriate evaluation of abutment teeth, including those with composite restorations, contribute significantly to long-term success. Careful treatment planning, precise adhesive procedures, and follow-up are essential to maintain restoration stability and periodontal health.

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