

Prosthetic Rescue of Fractured Abutments Under an Existing Fixed Partial Denture: A Conservative Clinical Approach

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Abstract : Fractures of abutment teeth under fixed prostheses pose a major prosthetic challenge, particularly when full reconstruction is contraindicated or refused by the patient. This paper shows a clinical case study of the fabrication and adaptation of two metallic inlaycores on teeth 21 and 12, designed to support a pre-existing anterior metal ceramic bridge. Thanks to a precise impression of the intaglio surface of the prosthesis and rigorous laboratory fitting, it was possible to reconstruct the endodontically treated abutments without removing or replacing the bridge. This conservative approach demonstrates the importance of conservative management solutions for prosthetic complications that may occur while or after achieving the prosthetic treatment, ensuring long-lasting functional and esthetic restoration.

Keywords: Fracture; Abutment; Retrofitting; Duralay Resin.

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I. INTRODUCTION

Anterior fixed prostheses, in particular metal ceramic Fixed Partial Dentures (FPDs) remain a widely used solution for replacing one or more missing dental elements in the esthetic sector. However, the longevity of these restorations depends on the durability of the abutment teeth. When a fracture of an underlying abutment occurs, the practitioner is often faced with a difficult choice: remove the bridge and consider a new solution, or attempt to retain the prosthetic structure if it is still functional and aesthetically acceptable (1).

In this context, the use of metal inlays adapted to the existing infrastructure is an effective but demanding therapeutic alternative. It is based on a customized metallic post and core, perfectly adapted to the intaglio surface of the crown or bridge, and offers the advantage of reducing costs, delays and prosthetic trauma for the patient (2).

This article reports on a documented clinical case of the restoration of two fractured abutment teeth (21 and 12), under a meta ceramic three-unit FPD from 21 to 12, by adaptation of metallic post and cores. It highlights the key clinical and technical steps, the indications, and the benefits and limitations of this conservative approach.

II. CASE REPORT PRESENTATION

A 50-year-old patient, with no notable medical history, consulted our department with partial loosening of an anterior metal ceramic three-unit FPD replacing the tooth 11, performed 6 months ago. The patient reports discomfort on chewing and mobility of the bridge, with no associated pain. Clinical and radiological examination revealed a fracture of the fiber posts and resin build ups on the abutment teeth 12 and 21.

The prosthesis in place, although partially disinserted, has satisfactory structural and esthetic integrity. The patient expresses his refusal of an implant solution or a new bridge for economic and psychological reasons.

➤ The Intra-Oral Examination Revealed:

- The metal ceramic FPD was still intact.
- Satisfactory endodontic treatment of 21 and 12.
- No fracture signs in the abutment teeth: 12 and 21
- No signs of active periodontitis.
- Healthy gingival tissues, intact papillae.
- Good oral hygiene.



Fig 1 Intra-Oral View after Removal of the Fractured Fiber Post and Resin Build up



Fig 2 The FPD Try-in after Removal of the Fractured Fiber Post and Resin Build up

The evaluation concludes that the existing prosthesis can be retained and the fractured abutments can be reliably restored using metallic post and cores adapted to the bridge.

The bridge was gently removed to avoid any deformation or fracture of the metal framework or ceramic. Once removed, the intaglio surface of the prosthesis was cleaned with alcohol and then gently sandblasted with alumina oxide to remove cement residues and improve future adhesion. Then, a meticulous removal of the remaining fiber posts and rest cores was proceeded. Finally, a try in of the FPD was performed to make sure the bridge is well adapted to the residual structures of the abutment teeth.

The direct technique was selected for optimal adaptation to the bridge intaglio surface. First, a good isolation of the abutment teeth was performed, the plastic post was fit in the flared canal. A thin layer of petroleum jelly was applied in the root canal and the pulp chamber of the teeth abutments. An autopolymerizing acrylic resin material (Duralay) was used to rebase the plastic post and to build up the missing coronal structure. The inner surface of the bridge was lubricated and the prosthesis was immediately placed on the direct resin post and core to ensure the fit. Once the resin has polymerized, the bridge was carefully removed. The two perfectly shaped calcinable abutments are then removed and sent to the laboratory.

The post and core pattern is then casted in non-precious alloy (Ni-Cr). Individual and combined mouth fitting of both inlay-cores was proceeded. Simultaneous control of passive

bridge insertion on the abutments was also performed, and minor adjustments were made with carbide bur. A radiographic verification of the post adjustment in the flared canal was conducted.

The inlay-cores were permanently cemented with a reinforced glass ionomer cement offering good adhesion to dentin and metal. Once fully set, the bridge was repositioned using glass ionomer cement. Excess cement was removed, and the occlusion was checked and balanced.



Fig 3 The Metallic Post and Cores Cemented on the Abutment Teeth



Fig 4 Cementation of the Metal Ceramic Bridge



Fig 5 Final Result

III. DISCUSSION

The prosthetic management of an anterior bridge with fractured abutments represents a frequent clinical dilemma. Traditionally, removal of the bridge and fabrication of a new prosthesis are considered. However, in cases where the

infrastructure remains intact, functional and aesthetically acceptable, a conservation strategy is justified (3).

In such cases, custom-made metal abutments help preserve the existing prosthesis, while ensuring reliable functional rehabilitation.

➤ *This Approach Avoids:*

- Damage to adjacent dental structures.
- Additional costs associated with a new prosthesis.
- Recourse to more extensive treatments (implants, multiple extractions).

This method offers maximum precision, improved ergonomics for the dental technician, and reduces the risk of indirect impression errors (4,5).

The choice of the metallic post and core was made regarding the occlusal context of the patient: he has an anterior deep bite. The metallic post and cores have a better flexural resistance compared to fiber post and resin build ups, which makes them a more suitable solutions for anterior teeth with important horizontal forces (deep bite). The presence of a ferrule also justifies an intact finishing line and good adaptation of the prosthesis, which is a necessary condition for the prosthesis' durability in the face of shear forces (6,7).

The direct technique using intra-oral autopolymerizing resin (e.g. Pattern Resin®) has proved particular effectiveness: It provides an exact three-dimensional impression of the bridge's intaglio surface. It avoids the distortions and translation errors common in indirect impressions. It ensures passive adaptation, essential to the longevity of the reconstruction (8,9). This method also has the advantage of being less time-consuming, requiring neither customized impression trays nor duplicate models.

Despite its benefits, this approach has certain clinical requirements: The prosthetic infrastructure must be perfectly stable, without cracks or maladjustment. The resin pattern must be handled with care, as incomplete polymerization or abrupt removal can distort the morphology. The insertion of the bridge on two metal abutments requires precise alignment without lateral stress (10,11).

➤ *This Approach is Not Recommended in the Following Cases:*

- Non-restorable complex or vertical root fractures.
- Coronal height loss insufficient to ensure retention of the stump.
- Integrity of the bridge compromised functionally, aesthetically or biologically.

The technique presented illustrates the integration of the principles of modern restorative dentistry: Maximum preservation of structures, biomechanical optimization through the reuse of well-integrated existing structure and

respect for patient comfort, with fast, cost-effective, minimally invasive treatment.

It represents an effective intermediate and conservative treatment option that may help the practitioner to manage a common complication during a prosthetic treatment (12,13,14).

IV. CONCLUSION

The rehabilitation of fractured abutment teeth under an existing anterior fixed prosthesis, using custom-made metal inlaycores fabricated using the direct technique, is an effective, conservative and cost-effective prosthetic alternative. It avoids the need to remove or replace well-integrated prostheses, while providing a reliable and long-lasting infrastructure.

➤ *The Success of this Approach Depends on:*

- Rigorous assessment of feasibility: condition of prosthesis, quality of roots, absence of infection.
- Precise execution of the clinical protocol, particularly when producing burnable forms directly.
- Close collaboration with the laboratory, to ensure perfect fit of metal parts.

This type of treatment is an integral part of dentistry based on the principles of minimizing intervention, enhancing the value of existing structures and ensuring patient satisfaction, both functionally and aesthetically.

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