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Case Report

Pier abutment periodontal outcome – fixed fixed versus fixed movable bridge

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***ABSTRACT*:**
A pier abutment has been traditionally found as a common clinical occurrence. Theoretically, when it is intended to be managed with a fixed partial denture, a non rigid connector should be used. In practice, however, we see very less practitioners implementing such procedures. We present a unique case of oral rehabilitation in which a fixed, movable bridge was given against an opposing fixed fixed bridge that had already shown signs of deterioration. The effects of giving a fixed fixed designed bridge in such cases are evident and discussed.
Key words: connector, pontic, precision attachment, key – key way.

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Introduction

Using a fixed fixed bridge design for restoring a pier abutment situation either results in cement failure of either anterior or posterior retainer or if the cement is strong enough, the periodontal health of the pier abutment is endangered. [1] Using a non rigid connector to provide some form of stress breaking effect prevents debonding failure as well as prolongs periodontal health. [2] The stress breaking effect is achieved either by giving a precision or a semi precision attachment within the fixed partial denture. In low income countries the use of semi precision attachment in dentistry is limited to academic institutes and limited rural practitioners because they are costly and many dental laboratory technicians do not have the necessary skills of incorporating them within the cast framework. The fit of precision attachment within a cast restoration has to be accurate for proper fitting of two components.[3,4]

The use of semi precision attachments in any form of a dovetail or occlusal rest has been reported by various authors and tend to be satisfactory.[5,6] We present a rare case of both designs of restorations in a pier abutment situation, the maxillary with a failing previously cemented fixed fixed bridge design and the mandibular restored with a new fixed movable bridge design.

Case report

A female patient aged 40 years reported to the department of prosthodontics for replacement of her missing mandibular teeth since she was not able to masticate properly. While medical history was irrelevant, her social history revealed her very low socioeconomic status. The patient worked as a laborer and made her financial restrictions clear towards more expensive forms of dental treatment. Dental history revealed she had received multiple crowns and bridges in the past and all her treatment was done

at various institutes due to her migrant tenure. Extra oral examination did not reveal any significant abnormality while intra oral examination revealed presence of a kennedy class 3 partial edentulous situation in the maxilla and same class with one modification in the mandibular arch. The patient had previously received a cantilever prosthesis in relation to missing right maxillary lateral incisor with canine as an abutment **(Fig 1A)**. Radiograph also showed evidence of periodontal deterioration in relation to previously cemented maxillary fixed fixed partial denture in relation to first left premolar pier abutment **(Fig 1A)** . The mandibular arch had four crowns with two edentulous spaces on each side of the left second premolar. Clinical analysis of the occlusion revealed a mutually protected occlusion. The treatment options presented to her included removal of all faulty prosthesis followed by a strict oral hygiene maintenance as preparation for either an implant supported/fixed partial prosthesis, removal of faulty prosthesis followed by a fixed partial denture in relation to all edentulous areas, continue with existing prosthesis and a fixed movable bridge in relation to mandibular left side. The patient consented for the last treatment option since she was reluctant to remove all faulty prosthesis.

Figure 1: (A) Orthomopantograph showing existing prosthesis (B) Tooth preparation for fixed movable bridge (C) Wax pattern fabrication (D) First part of three unit bridge with rest (E)

Occlusal relation

The treatment initiated by a diagnostic cast mounted on a semi adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla). Design for fixed partial denture was planned to have a semi precision connector on the distal side of the premolar. Clinical procedure for restoration of the mandibular left arch started by performing tooth preparation in relation to the selected abutments **(Fig 1B).** A temporary fixed partial denture was fabricated (Unifast III, GC Europe) and a final impression (Extrude and Extrude Extra; Kerr Corp) was made after completing tooth preparations. The individual dies (Ultrarock, Kalabhai Dental, India) were prepared and a wax pattern was first fabricated for the anterior portion of the fixed, movable bridge **(Fig 1C)** which was later cast into base metal alloy (Wiron 99; Bego, Bremen, Germany) and porcelain (VMK-95 Metall Keramik; Vita Zahnfabrik, Bad Sackingen, Germany) was fused to it after metal trial in the patient **(Fig 1D).**

The occlusion for the anterior bridge was refined **(Fig 1E)** and the anterior part of the fixed, movable bridge was cemented (Harvard, Germany) in the patient's mouth **(Fig 2A).** Another definitive impression was made at this stage and casts were poured in a similar way as that for the first component. After routine laboratory procedures the posterior component was corrected for occlusion on the cast **(Fig 2B)** and cemented in the patient's mouth **(Fig 2C).** The posterior component was fabricated in all metal for better self hygiene maintenance **(Fig 2D).** The patient was given instructions and put on a regular follow up. The patient was educated about the condition of the maxillary fixed partial denture. Two years of follow up, she had developed severe mobility of the maxillary pier abutment while her mandibular fixed, movable bridge showed signs of healthy periodontal response.

Figure 2: (A) Anterior part of the fixed, movable bridge cemented in place (B) Posterior component of a fixed, movable bridge (C) Fitting of a posterior component of a fixed movable bridge (D) Occlusal view after one year follow up

Discussion

A case where a maxillary pier abutment has been restored previously with a fixed fixed bridge and the mandibular pier abutment on the same side was restored with a fixed movable bridge has been presented through this case report. The maxillary pier abutment was restored three years back and had already shown evidence of periodontal destruction of the distal abutment as well as the pier abutment distally. Since the opposing dentition was not present and the patient was masticating using only a premolar and molar on that side, the maxillary fixed fixed

prosthesis could survive for such time. Abnormal forces on a fixed fixed bridge that has been cemented with a rigid cement usually will result in the decementation of the retainer rather than periodontal damage. [7] In this case, the maxillary fixed fixed bridge seems to have been cemented with a resin cement. The stress distribution and values of a fixed partial denture and the pier abutment are thus concentrated on the pier abutment. [8,9]

All fixed partial denture treatment should be done in an ideal occlusion that is stable. [10] In this case we have not been able to do since there were too many faulty restorations which the patient was not ready to remove due to her being non available for long treatments. Coinciding the centric occlusion with the centric relation cannot be achieved without either removal of the faulty restorations or correction of existing restoration. The slide in centric was corrected in this case by occlusal equilibration procedure. [11]

Conclusion

A practitioner encounters a pier abutment situation very frequently in daily practice. The use of fixed fixed bridge should be judiciously used in cases where opposing occlusion is either a partial or a complete denture. A movable design using a semi precision attachment is a better option.

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