
"Designing a fixed partial denture without a pontic"- Case report

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Abstract

Clinical challenges for prosthetic rehabilitation though many, but rarely one encounters a situation where designing prosthesis is a challenge. One such situation is restoration of a hemisected mandibular molar that not only poses periodontal but also prosthetic tests to a clinician. Designing prosthesis for such situation requires knowledge of crown contours, crown contacts, angulation of the teeth, soft tissue contours and embrasures in their dynamic form. This article presents a case report of a hemisected mandibular that was restored with a fixed partial denture but without a pontic. Significant areas of concern are also discussed.

Introduction

Fixed partial dentures that are not single crowns have basic 3 components, namely retainer, a connector and a pontic. The pontic is that component that replaces the missing natural tooth or teeth. However, very rarely there are partial edentulous situations where the space supposed to be occupied by the pontic is obliterated by migrating adjacent and opposing teeth. One such situation arises when a mandibular molar has undergone root resection, a surgical procedure introduced by Farrar,¹ in which one or more roots of a tooth are removed at the level of furcation while leaving the crown and remaining roots in function.² Although the survival rates of such teeth have been debated, there are reports of them having a 90 % survival rate,^{3,4} with only 30 % failures over a 10 year period⁵⁻⁸ Despite their survival rate such cases pose a clinical challenge in prosthetic rehabilitation, especially with the little amount of space they present in between the two abutments. Available treatment options of such cases include a removable prosthesis, a resin bonded fixed partial denture, three-unit fixed restorations, maintenance of the posterior space or endosseous implants (the single-tooth implant generally is the best choice).

This article in the form of a clinical case report describes one such case of root resection, which has been rehabilitated by an innovative designing of

existing three unit fixed partial denture.

Case report

A female patient, aged 28 years reported to department of oral medicine with a chief complaint of pain in the lower right region since last two days, from which after preliminary investigations she was referred to respective departments of conservative, periodontics and finally Prosthodontics in a sequential and organized manner. Medical history was not significant and dental history included caries in relation to mandibular right side first molar that followed by severe pain. Clinical examination revealed periapical involvement of the tooth with furcation involvement (Class 1) and severe bone loss in relation to the mesial root. A multidisciplinary treatment plan was formulated that involved endodontic treatment of mandibular molar followed by root resection and a fixed partial denture.

After surgical removal of the mesial root, the tooth was filled with silver amalgam and the patient was referred to the department of Prosthodontics for restoration of a treatment induced Kennedy class 3 situation (**Fig 1**). Preliminary impressions with irreversible hydrocolloid (Jeltrate Alginate, Fast Set; Dentsply Intl, New York) were made following which the impressions were poured with type 3 dental stone (Pankaj Industries, Mumbai, India). Diagnostic casts were evaluated for the space present between two abutments. Tooth preparation was done in relation to the mandibular right bisected molar and the second premolar to receive porcelain fused to metal crown (**Fig 2**). **Final impressions were made using** Addition polyvinyl siloxane material (Reposil, Dentsply/Caulk; Milford, DE, USA) and a temporary fixed partial denture was cemented with Eugenol-free zinc oxide cement (Prevision Cem; Heraeus Kulzer). The final casts were poured with Type IV dental stone (Ultrarock, Kalabhai Dental, India) following which wax patterns were fabricated. Regular standardized laboratory procedure for casting and porcelain were carried. The design of the wax pattern was innovated as per the clinical judgment of the case based on occlusal forces, periodontal health, oral hygiene measures, self-cleansing ability and food flow pattern. Final restoration was made (**Fig. 3**) and finally cemented in

place (**Fig.4**) The patient was followed up for a period of 2 years after necessary instructions regarding maintenance and use of the prosthesis were given.

Discussion

Even though root resection can eliminate the unfavorable morphology to good oral hygiene,⁹ the prognosis of an endodontic periodontal combined lesion is considered poor as their treatments are challenging and require potential healing.¹⁰

For conventional fixed partial denture, the space available for pontic in a Kennedy class 3 partial edentulous situation determines the type of pontic indicated for a particular situation. In the current case the pontic space being less posed a clinical challenge in designing the connectors and contours of the pontic. Conventional design of a fixed partial denture in this case would hamper self-cleansing potential of the prosthesis which in turn would initiate periodontal problem in the critical area present on the bisected root. A design based on existing contours of the edentulous ridge was developed with the following innovations in the design:

- The retainer for the bisected molar was extended mesially to act like a pontic.
- The connector between the bisected molar and the pontic was flared towards the occlusal surface so as to act like a modified sanitary pontic.
- The occlusal surface of the retainer on the bisected molar was extended mesially to attach directly with the retainer on the premolar.
- The occlusal surface area of the retainer on the bisected molar was equal to the occlusal surface area of the original bisected molar.
- The retainer on the premolar was also flared so as to provide a self-cleansing mechanism like that of a modified sanitary pontic.
- The finish line placed on the proximal surfaces of the adjacent abutments was a heavy chamfer to accommodate extra thickness of the metal due to flare in that area.

Conclusion

Extreme clinical challenges are overcome with sound and basic, applied sciences without compromising principles. All innovations in this study are based on these principles. Root resection management is a multi-disciplinary approach and each case will have its limitations.

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Illustrations

Illustration 1

IOPA showing the hemisected mandibular right molar



Illustration 2

Teeth prepared to receive a fixed partial denture



Illustration 3

Fixed partial denture without a pontic



Illustration 4

Partial denture cemented on prepared teeth

