

**NAVIGATING MIDLINE DIASTEMA WITH LOOP CONNECTOR FIXED PARTIAL
DENTURE: A CASE REPORT**

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ABSTRACT

Clinical situations with single missing tooth in the anterior aesthetic zone pose a significant challenge for the clinician. The options are further reduced in cases of increased mesiodistal spacing or a midline diastema. Rehabilitation using a conventional fixed partial denture (FPD) in these situations may result in too wide anterior teeth and poor aesthetics. Implant supported prosthesis can be ideally used in these cases, but in situations where rehabilitation with implants is not an option, modification of existing conventional FPD design can be done by incorporating a loop connector on the palatal aspect which maintains the diastema, thereby optimally fulfilling the aesthetic criteria. This article describes a clinical situation where a modified FPD design incorporating a loop connector was used to achieve aesthetic rehabilitation in maxillary anterior region while successfully maintaining the midline diastema.

KEYWORDS: Diastema, Aesthetics, Anterior edentulous area, Loop connector.

INTRODUCTION

Optimum aesthetics and functioning are two major factors governing the successful rehabilitation of anterior edentulous areas. Other primary factors to be considered are preservation and minimal risk to the adjacent supporting tissues, proper patient selection and treatment planning, marginal adaptation, colour matching, biocompatibility, technique sensitivity.^[1] Aesthetics is a major factor motivating the patient to undergo rehabilitative treatment. Replacing a single missing anterior tooth can be a challenge. Patient's exacting demands, on many occasions defeat the possibility of ideal treatment. In various clinical situations, due to increased spacing between the teeth, use of a conventional fixed partial denture (FPD) to replace any missing tooth may result in increased width of the anterior teeth, an over contoured emergence profile, all of which result in inferior aesthetics.^[2,3] Diastemas can be seen in both deciduous and permanent dentition. When physiological in nature, they approximate without any intervention. However, if diastema persists in permanent dentition, it may pose rehabilitative challenges in delivering the

prosthesis which can replicate this dental condition.^[3] Fabricating a fixed partial denture in terms of integrating space between teeth is difficult because of the presence of the connector between the retainer and the pontic. Various types of characterizations in a fixed partial denture are possible, but incorporation of space between teeth can only be accomplished by changing the design of the prosthesis.^[4] Implant supported prosthesis or FPD with loop connectors can be used in such cases of increased mesio distal spacing between the teeth or diastema in the anterior teeth region. Implant supported prosthesis are considered to be the ideal treatment of choice in such situations as the adjacent natural teeth are not affected. However, in low socioeconomic countries, implant treatment options are limited due to the cost and time consumption. However, replacement with an implant supported prosthesis might not be a suitable treatment option for all the clinical situations.^[5] For the successful maintenance of the existing diastema and in cases where implant placement is not an option, loop connector fixed partial denture is the most suitable treatment protocol.^[6] This clinical report describes a

technique for prosthetic rehabilitation of a partially edentulous patient with a loop connector FPD.

CASE REPORT

A 55-year-old male patient reported to the Department of Prosthodontics with a missing right maxillary central incisor. The patient had no significant medical history. He gave a history of midline diastema. On intraoral examination, it was observed that the edentulous region was large and excess spacing was present between the anterior teeth (**Fig 1**). Patient was presented with alternative treatment options like replacement with implant or treatment with fixed orthodontic treatment. However, an implant would entail surgery and a more protracted treatment. The patient was neither willing for orthodontic treatment nor for implant placement. Hence, replacement with fixed partial denture was the only viable option in such cases. Diagnostic casts were made and evaluation of occlusion was then carried out on the mounted diagnostic casts. After analysis, it was decided to fabricate a loop connector fixed partial denture with left maxillary central incisor as the abutment tooth and thereby efficiently maintaining diastema between the pontic and the retainer.

PROCEDURE

Tooth preparation was done in relation to left central incisor, with a subgingival finish line for enhanced aesthetics (**Fig 2**). After tooth preparation, gingival retraction procedures were carried out, a polyvinyl siloxane impression (Aquasil, Dentsply, Konstanz, Germany) was made using the putty reline technique (**Fig 3**), removable dies were fabricated. Die ditching was then performed. Wax pattern for the retainer and the pontic were fabricated with blue inlay wax (Bego, Germany), casting and ceramic build up procedures were then performed (**Fig 4**). The palatal loop cantilever connecting the pontic to the retainer was fabricated with a round 14-gauge wax.

While fabricating the loop, it was taken care that it was placed away from the rugae. Bisque trial was performed and any interferences were removed. Loop connector was then glazed and cemented using Glass Ionomer cement, Type I (GC Fuji Gold Label, Japan) (**Fig 5**). Post cementation instructions were given regarding the maintenance of fixed partial denture. The patient expressed complete satisfaction with the outcome of the prosthesis.



Figure 1: Preoperative photograph.



Figure 2: Abutment Tooth preparation.



Figure 3: Elastomeric Impression of the prepared teeth.



Figure 4: Wax Pattern Fabrication.



Figure 5: Postoperative View.

DISCUSSION

Rehabilitation of the patient with Kennedy's Class 3 clinical situation with a missing central incisor along with diastema have limited treatment options. Rehabilitation should be carried out keeping in mind the golden proportion, failure of which would result in an unaesthetic appearance and may also be detrimental to the periodontium.^[7] Connectors are that part of a FPD which connect the retainer and the pontic. These connectors can be of two types- Rigid or Nonrigid. When compared to loop cantilever connectors, the ones used in the fabrication of a Conventional FPD are more rigid.^[8] Modified FPDs with loop connectors, have an advantage of efficiently enhancing the aesthetics of the restoration by maintaining the mesiodistal space or the diastema and by creating a proper emergence profile. The flexibility of the loop connector depends on its length, diameter and its cross section.

Another alternative modification design for this case could have been the usage of a spring cantilever type connector. The connector design utilized in spring cantilever type of prosthesis is a long, thin and resilient bar which is closely adapted to the palate. It connects the pontic to teeth requiring full coverage crowns or a posterior tooth. Healthy and sound, posterior teeth have rarely been used as abutments to replace a single missing maxillary anterior tooth with increased mesiodistal spacing. The factors that limit its usage are the possible coronal displacement of the pontic which may occur due to deformation of the long palatal connector as it increases the chances of interference with speech and hence has low patient acceptance.^[9,10] Therefore, in this case report, the decision to restore the missing maxillary anterior tooth with palatal loop connector with only one tooth, i.e., the maxillary right central incisor as an abutment was made. The loop was cast from sprue wax that was circular in cross section. It could also be fabricated from platinum-gold-palladium (Pt-Au-Pd) alloy wire.^[7] While fabricating this connector, it was ascertained that the palatal loop did not interfere with the rugae and that the plaque control was not impeded.

The connectors were not fabricated with excessive bulk and maintained an intimate contact with the underlying mucosa. Hence, in this clinical situation, the rehabilitation with loop connector FPD not only addressed the problem of excessive mesio-distal width pontic space, but it also corrected the axial alignment of the left central incisor. Disadvantages with this design include a challenge in maintenance of oral hygiene, interference in tongue movement and speech discomfort. But proper patient education and training can enhance the ability to maintain oral hygiene and an improvement in speech over a period of time.

CONCLUSION

Aesthetics plays a major role in the rehabilitative decision making process. For enhancing and incorporating the required aesthetics and function, certain modifications to the existing conventional FPD designs need to be made. Although rarely used, loop cantilever prosthesis is one such design that has proven to be extremely functional in cases of increased mesiodistal spacing between the teeth and where this existing diastema needs to be maintained. Such designs when incorporated into clinical practice, with proper patient education have shown high patient satisfaction and success.

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