

## Loop Connectors: The Lost Boon in Prosthodontics

Indra Gupta, Tripty Rahangdale, Karvika Nayak\*, Pragya Kotnala, Nimit Jain and S M Noorani

Department of Prosthodontics, Mansarovar Dental College, Bhopal, India

\*Corresponding Author: Karvika Nayak, PG student, Department of Prosthodontics, Mansarovar Dental College, Bhopal, India.

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### Abstract

Loss of anterior teeth with existing diastema may result in excess space available for pontic. The main challenge of restoring this is excess of mesiodistal width for pontic. Replacement of single anterior tooth is a complex and challenging procedure that can be accomplished either by implant-supported restorations or conventional porcelain-fused-to-metal or resin-bonded fixed partial dentures or removable partial denture. The use of a conventional fixed partial denture (FPD) to replace the missing tooth may result in too wide anterior teeth leading to poor esthetics. The use of removable partial denture creates discomfort to the patient due to the palatal coverage and unesthetic appearance. The implant supported restoration is an expensive procedure and requires deep examination of the bone. In order to maintain the desired width diastema has to be maintained between the incisors. Patients with missing anterior teeth, along with diastema have very limited treatment options to restore the edentulous space. There are a few patients who consider the presence of diastema a goodluck charm for themselves and prefer to have a space between the central incisors. This condition presents great esthetic challenge for prosthodontist. Here, the loop connector comes into play. Loop connector is the simplest solution to maintain diastema at the same time maintain the aesthetics.

**Keywords:** Loop Connectors; Midline Diastema; Metal Framework; Pontics; Maxillary Incisors

### Introduction

Replacing a single missing anterior tooth can be a challenge. There are a multiple factors which motivate the patient to undergo any treatment dealing specially with the esthetics. The use of a conventional fixed partial denture (FPD) to replace the missing tooth may result in too wide anterior teeth, an over contoured emergence profile, which results poor esthetics. The diastema resulting from the missing central incisors can be managed with implant supported prosthesis or FPD with loop connectors [1-4].

If diastema is to be maintained loop connector fixed partial denture may be the simplest and best solution which also provides optimum restoration of esthetics [5]. This case series describes a technique to fabricate a three unit FPD with a modified palatal loop connector to provide maximum esthetic and functional correction for a patient with diastema between lateral and central incisor and missing central incisors.

### Case Report

**Case 1:** A 28-year-old male patient reported to the department of prosthodontics, with the chief complaint of missing teeth in upper left front region. On intraoral examination, it was seen that left maxillary central incisor was missing and the edentulous space was large (Figure 1).



**Figure 1:** Preoperative picture showing missing teeth.

The patient gave a history of trauma due to an accident about two years back and subsequent avulsion of the tooth. The patient gave a history of the midline diastema. A conventional FPD was not possible due to large spaces between the anterior teeth. Patient was neither willing for implant placement due to financial crises nor a removable partial denture. He wanted a fixed alternative for his missing tooth. In fixed partial, there were mainly two options, one is spring cantilever FPD and other is loop connectors. Spring cantilever FPD was not planned as no posterior tooth needed a crown. So, treatment plan chosen was a loop connector FPD with the left central incisor as pontic and right central incisor and left

lateral incisor as the abutment teeth, maintaining diastema between the pontic and the retainers.

**Procedure**

**Case 1:** Tooth preparation was done in relation to the right central incisor and left lateral incisor, with subgingival in order to enhance the esthetics as it prevents the color of the metal from showing thorough translucent enamel [6] (Figure 2).



**Figure 2:** Postpreparation with equigingival margins.

Gingival Retraction were carried out and a polyvinyl siloxane (soft putty and LV) impression was in a rim-lock impression tray and removable dies were fabricated. Patterns of the FPD with loop connectors were fabricated with blue inlay wax. Palatal loop was fabricated connecting the pontic to the retainers on the right central incisor and the left central incisor was made with round wax (gauge 14) (Figure 3).



**Figure 3:** Wax pattern.

The loop was placed away from rugae. Rest of the laboratory procedures were common with the conventional metal- ceramic FPD construction. Try in was done and interferences if any were removed. The surfaces of abutment teeth were steam cleaned and the restorations were cemented with Glass ionomer cement (GIC) Type I luting cement (Figure 4,5).



**Figure 4:** Occlusal view.



**Figure 5:** FPD cemented in mouth.

**Case 2:** A 22-year-old male patient reported to the department of prosthodontics, with the chief complaint of missing teeth in upper left front region. On intraoral examination, it was seen that left maxillary central incisor was missing and the edentulous space was large (Figure 6).



**Figure 6:** Preoperative intraoral examination.

The patient gave a history of trauma due to a fall from stairs about a year back resulting in avulsion of the tooth. A conventional FPD was not possible due to large spaces between the anterior teeth. Patient wanted a fixed alternative for his missing tooth along with a midline diastema. In fixed partial, there were mainly two options, one is spring cantilever FPD and other is loop connectors. Spring cantilever FPD was not planned as no posterior tooth needed a crown. So, treatment plan chosen was a loop connector FPD with the left central incisor as pontic and right central incisor and left lateral incisor and left canine as the abutment teeth, maintaining diastema between the pontic and the retainers.

**Procedure**

Tooth preparation was done in relation to the right central incisor and left lateral incisor and left canine, with subgingival in order to enhance (Figure 7).



**Figure 7:** Post preparation.

Gingival Retraction were carried out and a polyvinyl siloxane impression was made using. Patterns of the modified FPD with loop connectors were fabricated with blue inlay wax (Figure 8).

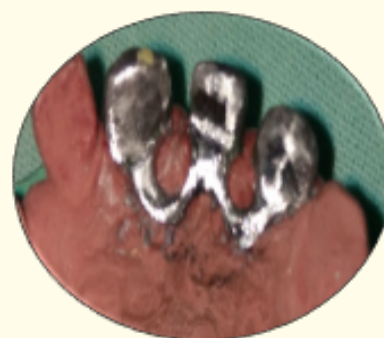


**Figure 8:** Wax Pattern with inlay wax.

Two palatal loops one connecting the pontic to the retainers on the right central incisor and the left central incisor and other connecting left central to left incisor were made with round 14-gauge wax. The loops should be placed away from rugae. Rest of the laboratory procedures were common with the conventional metal-ceramic FPD construction. Try in was done and interferences if any were removed (Figure 9).



**9(a):** Frontal view.



**9(b):** Occlusal view.

**Figure 9:** Metal coping try in.

The surfaces of abutment teeth were steam cleaned and the restorations were cemented with Glass ionomer cement (GIC) Type I luting cement (Figure 10).



10(a): Palatal view.



10(b): Frontal view.

Figure 10: FPD cemented.

## Discussion

Connectors act as a link between different parts of FPD (i.e., pontic and retainers). The anterior extensive diastema along with missing central incisors with wide spaces is a difficult task to resolve with conventional FPD without compromising with esthetics. Maximum esthetic results may be obtained only if the natural anatomic forms of the teeth are protected and the diastema is maintained [7]. A spring cantilever fixed partial denture could have been another less time-consuming alternative. The palatal connector in spring cantilever fixed partial denture is a type of loop connector. The connector here is a long, thin and resilient bar, closely adapted to the palate so that it may partly gain support from the soft tissue [6]. It connects the pontic to teeth requiring full coverage crowns or a posterior tooth. In some rare instance healthy and sound, posterior teeth have been used as abutments to replace a maxillary anterior tooth with diastema, using a resin bonded spring cantilever fixed

partial denture [7]. Coronal displacement of the pontic may occur if the long palatal connector in spring cantilever fixed partial denture is deformed, if thin, and it may interfere with speech and is often poorly tolerated [8]. For these reasons this design is rarely used.

In a loop connector, the loop should be of adequate thickness to prevent deformation but not so much that it becomes noticeable for the tongue. The incorporation of a loop connector in this design allowed the patients to be given an excellent esthetic results without compromising the functionality of the restoration. Thus, loop connectors have several advantages when it comes to the esthetic appearance [9-11].

Disadvantages of loop connectors include additional laboratory procedures, difficult to maintain oral hygiene, interference in tongue movement and discomfort in speech. However, keeping the connectors round and small in size will not affect the phonetics [12,13].

## Conclusion

The use of loop connector is not a commonly used treatment plan but it serves as an excellent alternative treatment option in cases with diastema and interdental spacing. It is required when an existing diastema is to be maintained in a planned fixed prosthesis, as in the above cases. The patients were very pleased with the final outcome as the restoration achieved excellent form and function.

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