

## Loop Connector: A Treatment Option to Achieve Effective Esthetics in Diastema - A Case Report

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### Abstract

It is a great esthetic challenge for the prosthodontists to restore the edentulous space in missing tooth with diastema. The conventional fixed partial denture (FPD) is used to replace the missing tooth that may result in wider anterior teeth leading to compromised esthetics. Replacement of single anterior tooth is a complex and challenging procedure that can be accomplished by implant-supported restorations. If an implant-supported prosthesis is not possible, loop connector fixed partial denture may be the simplest and effective solution to maintain the diastema and provide optimum restoration of esthetics and also preserve the remaining tooth structure of abutment teeth. This article presents a case with excessive space in the anterior region treated with a loop connector to achieve ideal esthetic results in the maxillary anterior zone.

**Key words:** Anterior edentulous space, Diastema, Eduntulous space, Increased mesio-distal width, Loop connector.

### Introduction

Life is not merely being alive, but being well and healthy also. In aged, dental health forms an integral part of overall health and oral rehabilitation entails the performance of all the procedures necessary to produce healthy, esthetic, well functioning and self-maintaining masticatory mechanism.<sup>1</sup>

Numerous factors affecting esthetics may motivate a patient to look up for prosthodontic treatment. While the restoration of maxillary anterior teeth demand creativity of the dentist, and

esthetic repercussive procedures. An unusually wide or large restoration will not only affect occlusal function but will also produce an unnatural appearance.<sup>2,3</sup>

Replacement of missing anterior teeth is a challenging and complex procedure for operators in order to achieve ideal esthetics. The clinical case is further worsened with drifting of teeth into the edentulous space or a previous existing diastema.<sup>4</sup>

Spacing between teeth or diastema is a common esthetic problem and it negatively interferes with harmony of the smile. It is frequent to encounter a clinical

situation with excessive pontic space or presence of localized/generalized spacing between the teeth in need of prosthetic restorations. When pre-prosthetic orthodontic space correction (closure/reduction) is not selected, then depending upon the span of spacing and patient wishes, diastema can be maintained or closed in the restoration.<sup>5</sup>

The diastema can be managed with implant-supported prostheses, conventional FPD or FPD with loop connectors. The use of a conventional fixed dental prosthesis (FDP) to replace the edentulous space may result in too widened anterior teeth, an over-contoured emergence profile, which leads to poor esthetics.<sup>6,7</sup>

Closing diastema with conventional fixed dental prosthesis (FDP) without taking in consideration the golden proportion would prevent an esthetically pleasing appearance and would have detrimental effects on the periodontium/ attachment apparatus.<sup>5</sup> So, the final outcome should be considered thoroughly before it is decided to close the diastema with the prosthesis. Maximum esthetic results may be obtained if the natural anatomic forms of the teeth are protected and the diastema are maintained with minimal over-contouring of the adjacent teeth.

Although rarely used, loop connectors are the simplest and effective solution to address this problem of excessive mesio-

distal width pontic space and provide optimum restoration of esthetics.<sup>6,8,9</sup>

### Connectors:

Connectors are the portion of a fixed partial denture that unites the retainer(s) and pontic(s).<sup>10</sup> (GPT 9)

There are two type of connector.

- Rigid connector
- Non rigid connector

### CLASSIFICATION OF CONNECTORS:

1. RIGID CONNECTOR:
  - A: Cast connector
  - B: Soldered connector
  - C: Welded connector
2. NON RIGID CONNECTOR:
  - A: Dovetail or Key-Key Ways
  - B: Split Pontic
  - C: Cross-Pin and Wing
  - D: Loop Connector

Rigid connectors are the portion of fixed partial denture that joins the individual retainer and pontic together as complete restoration. (Fig.1)

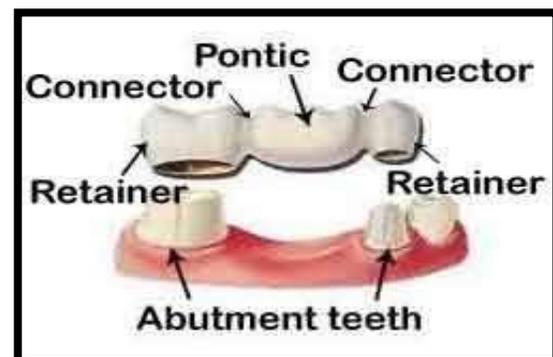


Fig. 1. Part of FPD

Non rigid connectors are indicated to relieve the stress which is associated with

the abutments. In long pontics and tilted abutment cases, it relieves stress at midspan.

### LOOP CONNECTOR:

In a loop connector fixed partial denture, the connector has a loop on the lingual aspect of the prosthesis that connects adjacent retainers and/or pontic. The loop may be cast from sprue wax that is circular in cross section or shaped from platinum-gold-palladium (Pt-Au-Pd) alloy wire.<sup>11</sup> (Fig. 2)



Fig. 2. Loop Connector

### Indications:<sup>4,9</sup>

- Presence of excessive mesio-distal pontic space due to pre-existing spacing or diastema.
- Patient willing to incorporate the diastema present prior to loss of teeth.
- Splinting of periodontally compromised and pathologically migrated teeth to distribute the occlusal load.
- Clinical situation where the prognosis of primary abutment is

uncertain and patient desires to retain it. The immediate adjacent tooth is skipped.

### Limitations:<sup>4,9</sup>

- Leads to food accumulation.
- Difficulty in maintaining hygiene especially in patients with limited manual dexterity.
- Interference in tongue movements and phonetics.
- Relative flexibility as compared to conventional connectors.

Loop connectors are preferred less in mandible because of few other limitations:

- Continuous irritation to tongue as it lies against the incisors at rest.
- Lingual frenum attachment further limits connector placement and extension.<sup>2,3</sup>

This clinical report describes a technique to fabricate a four unit FPD with a modified loop connector to provide maximum esthetic correction for a patient with diastema/spacing between missing maxillary central incisors.

### CASE REPORT

A 44 year-old male patient reported to the Department of Prosthodontics, and Crown & Bridge, College of Dental Science, Amargadh, Bhavnagar, Gujarat with a chief complaint of dislodgement of prosthesis and Unesthetic appearance. His past dental

history revealed that he had spacing between maxillary central teeth. Patient was wearing fixed prosthesis (acrylic facing) since 3 years after loss of teeth. Some part of the acrylic facing was chipped off from the metal bridge, therefore patient wanted replacement of the fractured prosthesis. It was also observed that the replaced teeth were unusually wide. It was planned to remove the existing prosthesis and replaced it with a new four unit fixed dental prosthesis. After removal of prosthesis, a diagnostic impression was made with irreversible hydrocolloid impression material (Imprint alginate) and the casts were poured with dental plaster.



Fig. 3. Fracture restoration of left canine after bridge removal

Clinical examination revealed that the anterior edentulous space was greater than the approximate size of the adjacent central and lateral incisor. Conversation with the patient affirmed that he was highly conscious about his esthetics and speech.

There were three treatment options left:

1. Four unit fixed dental prosthesis with rigid connector
2. A loop connector fixed partial denture
3. A spring cantilever (which is in fact a variation of loop connector).<sup>12</sup>

Mock up restoration with conventional FPD and FPD with loop connector was done and shown to patient. As the edentulous space was large, the fixed dental prosthesis with rigid connector looked larger than the natural teeth. After the patient consent, the FPD with loop connector was selected. The maxillary right central incisor and left canine were selected as abutments and left central and lateral incisor as pontic maintaining the diastema between the anterior teeth.

Refinement of abutment and Shade selection was done (Fig.4). The impression was made with elastomeric impression materials using putty wash two stage

impression technique. Cast was poured (Fig.5). Fabrication of waxed pattern (Fig.6). Coping trial was done (Fig.7).



Fig. 4. Tooth Preparation Palatal and Frontal View



Fig. 5. Maxillary cast



Fig. 6. Fabrication of wax pattenen



Fig. 7. Coping trial



A



B

Fig. 8. Final cementation of Loop connector Fixed dental prosthesis A. Palatal View. B. Facial View

Porcelain build up of the selected shade was done and the prosthesis was glazed. A mutually protected occlusion was planned for longevity of the prosthesis and confirmed at the final stage of bisque trial. The aesthetic appearance of the final prosthesis was confirmed with the patient



Fig. 9. Pre-operative and Post-operative view

and then, luted with resin modified glass ionomer cement. The excess cement was removed from the margins of the prosthesis. (Fig.8)

The Pre-operative and Post-operative photographs are shown in Fig 9. Oral hygiene instructions were given to the patient. Interdental brush was prescribed for

maintenance of hygiene between the prosthesis.

### Discussion

Connector design determines the health of the periodontal ligament under the FPDs. The only viable option available to maintain spaces in FPDs is with the aid of loop connectors, which is both esthetically and mechanically challenging. This flexibility of loop connectors can relatively be managed by using shorter lengths and increasing the diameter of the loop, and if possible, still keeping their shape as round as possible.<sup>5,13</sup> These connectors are reportedly over contoured, and are therefore difficult to clean off the plaque.<sup>14</sup>

Bhandari S., Bakshi S<sup>5</sup> conducted a study on Survival and complications of unconventional fixed dental prosthesis for maintaining diastema. They had treated eleven patients with porcelain fused to metal full coverage restorations joined with loop connectors. They all were assessed for the clinical status and longevity of the loop connectors. All the patients were asked to fill a simple close-ended questionnaire to provide their perspective on the limitations and outcome of the treatment and rate their satisfaction level on the scale of 1-10. They concluded that designing of loop connectors for each patient is an excellent treatment modality to successfully maintain excessive (single/generalized) spacing between teeth.

Only one patient (Group 3) showed calculus deposit along the loop at 1½ years follow up and he admitted to have not used any kind of oral hygiene measures below the loop connector after one year of prosthesis delivery. Only one FPD was categorized as failure due to the fracture of loop connector. New prosthesis was made after increasing the diameter of the loop while keeping the length and circumferential form the same. Two female patients who had experienced multiple problems after prosthesis delivery desired to have a new prosthesis with closed spaces.

Patient might object to projecting minor (loop) connector in the palatal region, and it might be a potential site for food trap in the patient.<sup>9</sup> If the patient can get adapted to the palatally projecting connector, incorporation of loop connector is an excellent treatment option in cases where excessive space is present, to maintain the midline diastema is a viable and suitable treatment option.

#### Conclusion

Treatment planning is very critical to success when considering any form of tooth replacement. Finalized treatment modality should suit patient's need. The use of loop connectors in the fixed dental prosthesis treatment, presents a straightforward way to fabricate a convincing prosthesis for the patient. Although they are rarely used, loop

connector offers a simple solution to a prosthodontic dilemma involving an anterior edentulous space, albeit with the maintenance of the slight diastema.

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#### Conflicts of interest:

There are no conflicts of interest.

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