



## Esthetic Rehabilitation with Non Conventional Fixed Partial Dentures - A Case Report

**Rupandeep Kaur Samra<sup>1\*</sup> and Dheeraj Gupta<sup>2</sup>**

<sup>1</sup>Professor, Department of Prosthodontics, Luxmi Bai Institute of Dental Sciences and Hospital, Patiala, Punjab, India

<sup>2</sup>Private Practitioner, Jaipur, Rajasthan, India

**\*Corresponding Author:** Rupandeep Kaur Samra, Professor, Department of Prosthodontics, Luxmi Bai Institute of Dental Sciences and Hospital, Patiala, Punjab, India.

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### Abstract

Increased mesiodistal space after loss of an anterior tooth in patients with existing diastema often presents with a dilemma in restoration of teeth in the esthetic zone. In patients with existing anterior diastema, restoration of loss of an anterior tooth can be quite challenging. Closure of space with orthodontic correction is time consuming. Restoration of anterior tooth along with soft and hard tissue loss calls for various treatment modalities such as implants, removable partial denture and conventional fixed partial dentures. Often the latter treatment plan does not come across as an esthetic treatment option so non conventional fixed partial dentures such as loop connectors are the preferable treatment choice. In the case report presented here, two missing anterior teeth had to be restored in a patient with generalised diastema. So a five unit fixed partial denture prosthesis with loop connector was planned.

**Keywords:** Mesiodistal Space; Diastema; Loop Connector

### Introduction

*"A smile is the universal welcome".*

*Max Eastman*

Behind every smile, there are teeth. Smile is the basic element that defines the persona of a person. It reflects the very essence of a person's being. Spacing between teeth is often encountered and sometimes impedes with the tranquility of an attractive smile.

Presence of diastema can be a normal finding in children during mixed dentition stage and also due to various developmental and pathological conditions such as high labial frenum attachment;

supernumerary teeth; mesiodens; increase in size of premaxilla during eruption of maxillary permanent incisors and migration of teeth due to underlying periodontal disease [1-3].

Etiology of midline diastema varies from adult tooth size disparity and excessive overbite of anterior teeth [4]. After extraction, the space tends to increase in cases with existing diastema. Loss of anterior teeth can result in physiological mesial drifting of adjoining teeth resulting in loss of space for mesiodistal dimension of the pontic [4,5]. Edwards JG in his research concluded that in patients with generalized spacing and diastema greater than 2 mm; the chances of reducing the spacing with normal development of teeth till maturation stage are minimal [6,7].

In cases where orthodontic space correction is not feasible, then non-conventional fixed partial denture (FPD) prosthesis is planned. However, the final esthetic result of treatment plan should be contemplated carefully before the closure of the diastema with the final fixed partial denture [4,8].

The conventional fixed dental prosthesis with rigid connectors often results in wider restorations on the abutment teeth with wide pontic designs and an unaesthetic emergence profile which is displeasing to the eye [5,9].

Non-conventional FPD with loop connectors are used when an existing diastema is to be maintained in a planned FPD. This prosthesis consists of a loop on the palatal/lingual side of the final prosthesis that connects the adjacent retainer or pontic [9]. The designing of the prosthesis should be done precisely so as to enable adequate plaque control from underneath the prosthesis in contact with tissue area [5].

Non-conventional FPD such as loop connectors are the considered form of treatment in patients with increased mesiodistal width for pontic and presence of either localized/generalized spacing between abutments [7,10].

## Case Report

The case involves a 25-year-old male patient who reported to the Department of Prosthodontics, with a missing left maxillary central incisor and canine. The patient gave a history of trauma due to a fall from a motorbike over a year ago which resulted in subsequent avulsion of the left central incisor. Left lateral incisor had been treated endodontically and the left canine was lost as a result of caries five years back. He had been wearing removal partial denture for the missing 21 and 23 but now he wanted fixed prosthesis. His primary concern was achieving optimal and natural esthetics and improving the malpositioned left anterior tooth.

On intraoral examination, the anterior edentulous space was considerably larger mesio-distally than the contralateral maxillary central incisor and canine (Figure 1a). Patient reported that even in natural dentition, space was present between the central incisors and lateral incisor. 13 was in crossbite relation while the posterior teeth were in normal occlusion (Figure 1a). A single tooth implant for both 21 and 23 was a very practical and minimally in-

vasive treatment alternative as it would allow for final restoration maintaining both mesial and distal diastema. Due to the presence of a labial concavity, a graft would have been mandatory for implant placement and an esthetic prosthesis. However, the patient was not willing for surgery for implant placement due to economic constraints and wanted an immediate fixed prosthesis for the missing central incisor and canine. Hence, an alternative treatment plan with five-unit porcelain fused to metal FPD incorporating a loop connector with 11 and 21, 21 and 22 was considered. This would allow the maintenance of the diastema and yet achieve excellent esthetics while giving a fixed treatment option to the patient.

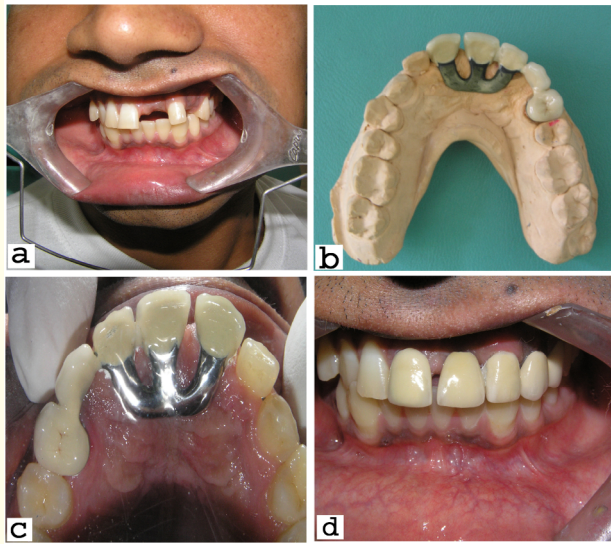
Primary impressions were made of maxilla and mandibular arches with alginate (Vignette, Dentsply DeTrey GMBh Pvt. Ltd.) and poured with dental stone. Cast was duplicated. Two mock ups were prepared on the casts involving loop connector with 11 and 21, 21 and 22. In the first mock up, care was taken to improve the angulation of 22 and 23 was prepared in cross bite as in the adjacent quadrant so that the patient gets an idea as to how the final prosthesis would look. In the second mock up, the canine cross bite was corrected and the distobuccal rotation with 22 was modified.

The second mockup was found to be aesthetic and more appealing to the eye. After patient's approval, crown preparation was done with 11, 22 and 24 for five unit FPD. Retraction procedures (Ultradent Ultrapak knitted cord no.1) were carried out and an addition polyvinyl siloxane impression (Aquasil hard putty and Aquasil light body, Dentsply DeTrey GMBh Pvt. Ltd.) was made using the two step putty reline technique with spacer in a perforated stock impression tray. Casts were poured and wax patterns made with loop connector between 11 and 21 and 21 and 23 as decided with relief of about 0.2 mm and casted in Cobalt chromium alloy (Bego Wironit Cobalt chromium alloy) and porcelain build up was done (Figure 1b).

Fit was checked in patient's mouth (Figure 1c) and the final prosthesis was finally cemented after approval from the patient (Figure 1d). Patient was happy with the esthetics.

## Discussion and Conclusion

Non conventional connectors are usually indicated to relieve stress or to correct mal-aligned fixed partial denture abutments [11,12]. They are usually tenon-mortise (non rigid connector), loop



**Figure 1a:** Pre-operative view showing missing 21 and 23.

**Figure 1b:** Five unit bridge with loop connector prosthesis on cast.

**Figure 1c:** Prosthesis placed in patient's oral cavity.

**Figure 1d:** Post-operative view of final prosthesis after cementation.

connectors and/or split cantilever connectors [9]. Loop connectors or spring cantilever designs are used when an existing diastema is to be kept in the final fixed prosthesis [12]. Loop connector as the name suggests has a connector in the form of loop on the palatal aspect. The pattern for the same is prepared by using either sprue wax of circular cross section or from platinum- gold-palladium (Pt-Au-Pd) alloy wire and then casting is done [9].

If only one single maxillary incisor is missing, then a cantilever fixed partial prosthesis can be given with loop connector connecting the adjacent strong abutment to maintain spacing amongst the maxillary anteriors [13].

Tylman defined spring cantilever bar as a beam supported by only one fixed support at one of its ends [5]. The cantilever principle has been applied in two-ways; firstly in the form of the spring

cantilever bridge, in which the pontic is supported by a bar attached to a remotely situated retainer, and secondly in the form of direct cantilever bridge, in which the pontic is attached to an adjacent retainer [13,14].

In this case report, direct cantilever bridge was given where the pontic was attached to adjacent retainers. It is thus both tooth and tissue supported bridge. The loop connector should follow the natural contours of the tissue in the palate, so that its lateral margins do not cause any obstruction or discomfort to the tongue [11,15]. The cross-section of the bar should be flat, or oval/ round in shape [16]. The fit of prosthesis should be carefully checked to ensure firm seating on the soft tissue and minimize food trapping [11]. The basic flaw of this design can be the weak junction of retainer and the bar [17].

The connector used in this particular case is a loop connector. The connector here is long, thin and resilient, closely adapted to the palatal mucosa with relief provided [17]. The connectors should not be thick and should have close contact with the underlying mucosa. If a wide gap is present, there are chances that the patient develops the habit of touching the lateral borders of the loop connector and pushing between the gap with the tip of the tongue [15,16].

Limitations of the this non-conventional FPD include interference in tongue movements and phonetics and food lodgement below the loop connectors, especially in patients with poor oral hygiene maintenance [7].

Non-conventional fixed partial dentures are the treatment of choice as not every case can be solved with the conventional fixed partial dentures. Caution should be practiced in the designing of the connector so that it suits the purpose and looks esthetically pleasing on the patient. Correct planning and patient's acceptance is important for the overall success of the prosthesis.

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