

## Loop Connector to Improve Esthetics of a Fixed Partial Denture

Shailesh Jain<sup>1\*</sup> and Vishwadeepak Singh<sup>2</sup>

<sup>1</sup>Department of Prosthodontics, Sharda University, India

<sup>2</sup>Department of Prosthodontics, NP University, India

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### Corresponding author:

Shailesh Jain,  
Department of Prosthodontics and  
School of Dental Sciences, Sharda  
University, India,  
Email: shaileshbluedoct@gmail.com

### ABSTRACT

Diastema between natural teeth is not preferred by most patients. However, there are situations when generalized diastema in natural dentition do not allow placement of a prosthesis which does not incorporate the same characteristic in its design. We present a case of a mandibular Kennedy class four partial edentulous situation in a young female patient who also presented with a high lip line and a deep bite. A four unit fixed partial denture using a loop connector was designed to incorporate the spaces between artificial teeth.

### INTRODUCTION

The occurrence of diastema between the natural teeth is a commonly encountered clinical situation. It is due to the discrepancy between the skeletal and dental components of the oral cavity and in most of the conditions it is due to the improper inclination of natural teeth within the arch [1]. The teeth when proclined tend to remain out of contact with adjacent teeth resulting in spaces between them. It may be present in isolation called midline diastema, or it may be generalized. Replacement of natural teeth where generalized spacing is present poses problems in the fabrication of adequately wide restorations. The spaces can be easily managed with an implant supported prosthesis [2] while with the fixed partial denture they have been traditionally restored using a loop connector [3]. Various other treatment modalities within the designs of fixed partial denture treatment are the spring cantilever bridge [4] and the resin bonded loop connector bridge [5,6]. Planning a removable partial denture in such cases has been straight forward since the spaces between teeth can be created at will and can be tried in the patient's mouth to the exact width. However, the patients in general are apprehensive of wearing a partial denture [7] with or without a diastema. Conservative treatment options within the fixed partial denture also include using a partial veneer retainer to support a fixed partial denture especially if the occlusion permits [8,9].

Replication of midline diastema in a conventional fixed partial denture has been reported mostly in maxillary dentition. We present a unique case of replication of diastema in a fixed partial denture for a four unit mandibular anterior bridge.

### CASE REPORT

A young female patient was referred to the department of prosthodontics for replacement of missing mandibular anterior teeth. Patients medical, drug, social and dental history did not impact the current treatment plan. Dental history disclosed loss

of anterior teeth due to trauma suffered during playing. Extra oral examination was within normal limits while intra oral examination disclosed a high lip line (incisal exposure of more than 5 mm when the patient spoke seriously) (Figure 1a,b), flared mandibular anteriors (Figure 1c) and a deep bite (Figure 1d) with maxillary central incisor below the incisal plane. Occlusal analysis was performed clinically and on the diagnostic casts mounted on a programmed semi adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla). After carrying a thorough radiographic investigation, the treatment options presented to the patient included single implants supported crowns, conventional three unit fixed partial denture with modified connector and lastly the cast partial denture. The patient consented for modified fixed partial denture. The mounted diagnostic cast was used as part of diagnostic wax up evaluation since the edentulous space was larger than required. An interim partial denture was fabricated to verify the esthetic results of diastema incorporation and to act as a guide during replication in a fixed partial denture. Routine clinical and laboratory procedures were done for fabrication of the fixed partial denture except during wax pattern fabrication. At this stage, the pontics and retainers were connected using a loop connector (bar shaped) made from 3.5 mm sprue wax (Bego, Wilhelm-Herbst, Germany).



Figure 1: (A) and (B) Extra oral view showing high lip line (C) intra oral view showing mandibular flared anterior teeth and (D) deep bite with the altered incisal plane.

A metal trial was done following which shades were selected for porcelain application. The final prosthesis was cemented in place (Figure 2A) using zinc phosphate cement Zinc phosphate

(Harvard, Germany) as part of the trial cementation procedure. The patient was put on a follow up protocol after receiving the post cementation instructions for maintenance and care. At the end of one year follow up, the patient was highly appreciative of the outcome of the prosthesis (Figure 2B).



Figure 1: (A) Four unit fixed partial denture with diastema cemented in place (B) Extra oral view after post insertion during follow up.

## DISCUSSION

The natural teeth have a size that is proportional to each other and to the face. When the width and length of a restoration are altered they may not affect occlusal function, but it affects the natural proportions that are present in the surrounding structures. Two different proportions have been reportedly associated with dentition, the golden proportion and the RED (recurring esthetic dental) proportion and both are considered as a standard for determining the size of artificial restorations [10,11]. The patient presented in this case had mandibular anterior teeth proclined due to which there was spacing between teeth. Placement of connector between pontic and pontic or retainers would have meant the closure of the spaces which unfortunately many patients prefer. But closure of these spaces is at the expense of increasing the width of the restoration, thus altering the proportion between length and width. Such restorations are unusually striking and can be identified even with a blink of an eye. Using a loop connector in a fixed partial denture allows incorporation of spaces within the denture, thus maintaining the esthetic proportions of the teeth. The loop connector may be cast using either a preformed sprue wax which is circular in cross section. It has also been shaped from a platinum- gold – palladium alloy.

The choice of a conservative retainer in the form of a resin bonded prosthesis combined with a loop connector design is dependant on existing occlusion [12]. Since the incisal plane in

the patient was not ideal due to long central incisors, the correction of incisal plane was unwanted since the canines were performing their role during eccentric movements by discluding posteriors and incisors. Occlusal plane correction for the fixed partial denture is essential before fabrication of a prosthesis since the vertical height of the restoration is dependant on the anterior guidance [13]. Complications related to unconventional fixed partial dentures have been reported [14]. We followed the patient for the period of three years till now and she has not reported any complication regarding mastication, phonetics or maintenance.

## CONCLUSION

Loop connector is an excellent conservative mean to incorporate diastema within a fixed partial denture. Proper design and the patient's acceptance is important to apply such designs in daily dental practice.

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## CONFLICT OF INTEREST

The authors declare that there was no conflict of interest associated during treatment or publishing the treatment results of this case.

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