

Case Report

Compound loop connector as an indication to incorporate multiple diastema in a fixed partial denture

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ABSTRACT:

Replacing the teeth in the anterior region is challenging and at times even a simple situation will turn out to be a complex treatment. Specifically, if the involved teeth are the maxillary incisors as they dominate the facial aesthetics and phonetics. The size of the partial edentulous situation can be deceptive and masks the impact of diastema between teeth when natural teeth are lost. Drifting of teeth creates another hurdle in aesthetic restoration. We present a case of an adult male patient who presented with such a clinical situation in the maxillary anterior region. A unique design of loop connector was devised to fulfill the treatment objective. The design included a four unit fixed partial denture in which the respective retainers and pontics were separated by multiple loop connectors, thus resulting in the incorporation of diastema within the restoration. The patient was ecstatic and satisfied with the treatment outcome.

Keywords: fixed partial denture, base metal alloy, partial edentulous, alveolar ridge, pontic

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INTRODUCTION

Replacing the missing anterior teeth to fulfill the exact demands of the patient is a challenging task for a clinician. Patients' expectations, esthetic requirement, condition of remaining teeth, anatomic and physiological characteristics of the abutments and the status of the edentulous ridge have to be considered while planning the prosthesis design. In terms of a functional occlusion, one has also to consider the amount of overjet and overbite that needs to be incorporated into the fixed partial denture. 1 Both overjet and overbite contributes to the formation of overall anterior guidance and lack of attention to both has been shown to result in aesthetic failures. 2 From the patients' point of view, accidental loss of anterior teeth can take a toll on the patient's personal and professional life, therefore efforts should be made by every dentist to replace lost anterior teeth accurately. a partial edentulous situation that masks the existence of diastema in the natural teeth deceives one's imagination unless a temporary or a definitive prosthesis is made, thus signifying the importance of mock preparation and wax up before concluding a treatment design in

prosthodontics. A wide partial edentulous space cannot be filled with oversized or over numbered teeth to achieve aesthetics. Continuous advancements, although have provided with treatment modalities like dental implants, which can incorporate diastema if placed individually. 3

If implants are not feasible for any reason, then modifications in connector design of fixed partial denture is usually the line of action in such cases. Connectors are being either rigid or non-rigid,4 a loop connector is basically a non-rigid connectors that also dissipate the occlusal forces. It consists of a loop on the palatal/lingual aspect of the prostheses that connects adjacent retainer or pontics. 5 While a single loop connector has been frequently reported in the literature as has been a different form, 6-8 there have been little or no report of compound (multiple) loop connectors used in a fixed partial denture design. This clinical report describes a rare case and the technique to fabricate a four unit fixed dental prosthesis with a modified palatal loop connector to achieve esthetic and functional rehabilitation in the maxillary anterior region.

CASE REPORT

A 36 year old male patient reported to the post graduate wing of the department of prosthodontics for the replacement of missing teeth in the upper front tooth region. The patient's medical, social, drug history were non significant, whereas dental history revealed loss of left maxillary central and lateral incisor in a road accident 3 years ago. Since then, the patient was wearing removable partial denture in the concerned region. Now he wanted some fixed treatment for the missing teeth since he was not satisfied with frequent loosening of the removable prosthesis. With all systemic and local factors within normal limits, the extra oral examination showed normal features. Intraoral examination revealed a Kennedy class 3 partial edentulous maxillary arch with missing maxillary left central and lateral incisors. The existence of the Interdental spacing was seen in the remaining maxillary and mandibular anterior teeth (**Fig 1 a**). The edentulous area was wide mesiodistally and the space was more than 2 centimeters mesio-distally (**Fig 1b,c**). Localized smoking stains and hard calculus accompanied by attrition were seen. On radiographic investigation inadequate amount of alveolar bone in the left maxillary central and lateral incisor region was found. Considering the availability of bone and esthetic requirement of maintaining Interdental space, treatment option of our unit of porcelain fused to metal FDP (from right maxillary central incisor to left maxillary canine) with multiple loop connectors were considered. Other treatment options presented included implant supported single tooth replacements, a cast partial denture and a modified fixed partial denture.

The treatment started with making preliminary impressions with Irreversible hydrocolloid (CA 37; Cavex, Haarlem, Holland), following which diagnostic casts were mounted and a diagnostic mockup was done on the cast to assess the mesiodistal space of the edentulous area. Shade selection was done using 3D Master (Vita Zahnfabrik, Badsackingen, Germany) shade guide on the first day of the appointment before actual treatment started. Tooth preparation for porcelain fused to metal prosthesis was carried out on right maxillary central incisor and left maxillary canine with equigingival margins and shoulder finish line in order to enhance the esthetics and prevent accumulation of plaque and calculus (**Fig 1d**). Gingival retraction was carried out with the gingival retraction cord (GingiTrac, USA) and final impressions were made with Addition polyvinyl siloxane material (Reprosil, Dentsply/Caulk; Milford, DE, USA). An interocclusal record was made using bite registration material (Aluwax). The provisional restorations were fabricated with a tooth colored acrylic resin and cemented with noneugenol temporary cement (Unifast III, GC Europe). The final impression was poured in type IV dental stone. Wax

patterns were fabricated using blue inlay wax and the loops with sprue wax were attached on the palatal aspect of wax patterns (**Fig 2a**). Wax spacer was adapted on the palate to provide adequate space in the area of loop connectors for the maintenance of oral hygiene. The wax patterns along with the sprue were invested with phosphate-bonded investment material and cast into the base metal alloy. (Wiron 99; Bego, Bremen, Germany). A metal trial was done on a clinical appointment and the incisal interferences were removed (**Fig 2 b**). The selected porcelain shade was added to the metal framework (**Fig 2c**). The prosthesis was checked for any occlusal interferences on the articulator (**Fig 2 d**) followed by a bisque trial.



Figure 1: (a) Extra oral view showing interdental spaces in remaining natural teeth (b) and (c) wide partial edentulous space (d) prepared abutment teeth



Figure 2: (a) Wax pattern connecting pontic and retainers with loop connector (b) metal trial (c) porcelain added to finished metal (d) correction for anterior guidance done on a programmed articulator



Figure 3: (a) cemented prosthesis (b) extra oral view of final prosthesis

Loop connectors were rounded and polished to the high shine. After required glazing of the porcelain the four units along with the loop connector was cemented on right maxillary central incisor and left canine with zinc phosphate cement (Harvard, Germany) (**Fig 3 a**) under proper isolation. The patient was given instructions regarding the oral hygiene maintenance and was put on strict follow up. Use of dental floss and interdental brush were recommended. During his subsequent visits he exclaimed to be satisfied with the esthetic outcome of the treatment (**Fig 3 b**).

DISCUSSION

A clinical case of an adult male patient who lost his left maxillary central and lateral incisors due to trauma was successfully restored with a loop connector FDP. The highlight of this case is the proper anticipation of the effect of wide mesio distal space of edentulous area and planning the treatment design that fulfilled esthetic requirements. This modified fixed dental prosthesis with loop connectors have several advantages when it comes to the esthetic appearance. It enhances the natural appearance and function of the restoration, maintains the proper emergence profile and interdental spacing.^{9,10} The disadvantage includes the initial difficulty in speech (especially linguo-palatal sound), interference in the tongue movement, technique sensitive, but gradually the patient gets accustomed to it. There should be adequate thickness of the connector to prevent deformation but not so much that it becomes conspicuous to the tongue.¹¹ While restoring the missing teeth the occlusion and esthetics should be considered at all levels, including preserving the existing periodontal condition of the abutment teeth.¹²

Certain clinical situations have been restored successfully using a cantilever design along with the use of a loop connector. In such situations, the

principles of designing a cantilever prosthesis should be considered first following which the use of loop connector should be devised.^{13,14} such situations demand a functional occlusal examination and at no time should the cantilever loop connector come in contact with the opposing teeth during excursive movements.

CONCLUSION

The main objective of establishing aesthetics and function was achieved. The patient was very pleased with the final outcome as the restoration achieved excellent form and function.

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