

Case report**Replacement of Missing Tooth in Maxillary Esthetic Zone Using Loop Connector -A Case Report**

Saini S, Singh R, Mahajan T, Sangur R

ABSTRACT: There are limited treatment options available to restore the edentulous space in patients with a missing tooth along with generalised spacing. The use of a conventional fixed partial denture (FPD) results in too wide anterior teeth leading to poor esthetics. The diastema resulting from the missing maxillary anterior can be managed with FPD with loop connectors or implant-supported prosthesis. A female patient reported with chief complaints of missing upper anterior tooth due to trauma. Her past dental history revealed that she was having generalised spacing between her upper anterior teeth. Considering her esthetic requirement of maintaining the diastema between 11, 12, and 13, the treatment option of three units porcelain fused to metal FPD with intermittent loop connectors between 11, 12, and 13 was planned. Connectors basically link different parts of FPDs. The modified FPD with loop connectors enhanced the natural appearance of the restoration, maintained the diastema and the proper emergence profile, and preserve the remaining tooth structure of abutment teeth.

Keywords: Diastema; Fixed Partial Dentures; Loop Connector; Spacing; Esthetics; Pontic.

Introduction:

Spacing between teeth or diastema is a common esthetic problem and it negatively interferes with harmony of the smile. The clinical situation should be encountered 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 ruled out, then depending upon the span of spacing and patient wishes, diastema can be maintained or closed in the restoration. However, the final esthetic outcome should be considered before the closure of the diastema with the prosthesis.

Etiology of generalized spacing varies from a normal finding in children to pathological conditions like supernumerary teeth, cysts, fibromas, mesiodens, and pathological migration due to periodontal disease. Excessive vertical overlap of incisor and adult tooth size discrepancies (dentoalveolar discrepancy) are the most common factors in midline diastema.

Diastema greater than 2 mm and diastema in patients with generalized spacing are at risk of not closing with normal development.¹ The only treatment option available for

maintaining the space(s) in an FDP is with the aid of loop connectors.

Indications:

- Patient wishes to maintain the space between teeth.
- Multiple joined prosthetic restorations in clinical situations with presence of localized or generalized spacing between abutments.
- Presence of excessive pontic space.
- Clinical situation requiring "jumping off" the immediate adjacent abutment. This may be done when the prognosis of primary abutment is uncertain and patient desires to retain it.
- Prosthetic restorations for pathologically migrated and periodontally weak teeth (Grade I and II).²

Limitations:

- Interference in tongue movements and speech.
- Food lodgement and hygiene maintenance below the loop connectors, especially in patients with limited manual dexterity.
- Relative flexibility as compared to conventional connectors.²

Case Report:

A 35-year-old female patient in good general health reported with chief complaints of missing maxillary right lateral incisor (Fig 1). Intraoral examination and diagnostic cast evaluation revealed the presence of excessive pontic space and it was not possible to compensate for the excessive space in the prosthesis. Her past dental history revealed that she was having generalized spacing between her upper anterior teeth and her medical history was non-contributory. Clinical and radiological examinations were normal.

The treatment options included an implant-supported prosthesis, FPD with loop connectors or resin bonded FPD. Considering her availability of bone and esthetic requirement of maintaining the diastema between 11, 12, and 13 the treatment option of three unit porcelain fused to metal FPD with intermittent loop connectors between 11, 12, and 13 was planned. Patient was educated about the maintenance of diastema with loop connectors between each unit of the prosthesis.



Figure 1. Pre-operative image showing



Figure 2. Tooth preparation i.r.t 11 missing maxillary right lateral incisor and 13.

The following clinical and lab procedures were carried out for the patients' oral rehabilitation:

Teeth preparation for porcelain fused to metal was done on 11 and 13 (Fig 2). The shoulder finish lines of the preparation were kept equigingival in order to enhance the esthetics as it prevents the color of the metal from showing through translucent enamel. Final impressions were made with two stage double mix putty light body rubber base impression material (Aquasil, Dentsply) and poured in Type IV dental stone (Pankaj Enterprises, M.P). Master casts were retrieved and die cutting was done. A quick-setting rigid poly vinylsiloxane interocclusal registration material was used to record the maxillomandibular relationship.

The provisional FPD was fabricated and cemented using Zinc-oxide eugenol cement (DPI). Casts were mounted on a semi-adjustable articulator (Hanau wide view) using a face-bow transfer. A 0.5 mm thick wax sheet was placed on the edentulous ridge to create a space to allow convenient access for oral hygiene. Patterns of the modified FPD with loop connectors were fabricated by using blue inlay wax (BEGO, Germany) on the cast, adjusted for optimal occlusal contacts, and contoured to final shape and form. The patterns were invested with a phosphate-bonded investment (Degudent, Dentsply) and cast in a base metal alloy (4All; ivoclar vivadent; Germany). After confirming the metal try in, the porcelain (Bellabond, BEGO) was fired according to the manufacturer's instructions. Pontics were contoured with a fine bur maintaining the space (Fig 3) and evaluated for esthetics and adaptation over residual ridge.

The occlusion was evaluated and adjusted wherever necessary. After glazing and polishing, the intaglio surface of the retainers was sandblasted using airborne-particles of 50-microns Aluminum oxide. Try in was done and interferences if any were removed. The surfaces of abutment teeth were cleaned and the restorations were cemented with Resin bonded luting cement

(RelyX™ Luting 2, 3M ESPE) (Fig 4). The patient was instructed to maintain the proper oral hygiene. Use of dental floss and interdental brush were recommended. The patient was evaluated after 1 week to assess the oral hygiene status.



Figure 3. The final prosthesis.



Figure 4. The FPD cemented in mouth

Discussion:

Basically, Connectors link different parts of FPD (i.e., pontic and retainers), thus constitute an important part of Fixed Partial Denture (FPD). Their designing determines the health of periodontal ligament under FPD. They may be either rigid or non-rigid. The presence of the missing incisors with a wide edentulous span is a difficult esthetic problem to resolve with conventional 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.³ The modified FPD with loop connectors enhance the natural appearance of the restoration, maintain the space and the proper emergence profile, and preserve the remaining tooth structure of abutment teeth. However, this type of prosthesis requires additional laboratory procedures. In addition, the

prosthesis design may cause difficulty in maintenance and may affect in phonetics especially linguopalatal sounds. However keeping the connectors round and small in size will not affect the phonetics.⁴

Photoelastic analysis has revealed that within the connector, the highest stress was found at the gingival region of the connector and the lowest in the middle of the connector and connector geometry affects the strength of ceramic materials.^{5,6,7} Therefore, smoother, less angled and more round connectors should be kept for lower stress levels.⁸

Conclusion:

Loop connectors have several advantages when it comes to the esthetic appearance, but the patient might object to projecting connector in the palatal region, and it might be a potential food trap for the patient. If the patient can get adapted to the palatally projecting connector, incorporation of loop connector is an excellent treatment option in cases where space is to be maintained in the fixed prosthesis.

Author's Affiliation: 1. Dr. Shweta Saini, Post Graduate Student, 2. Dr. Reshu Singh, Senior Lecturer, 3. Dr. Tanu Mahajan, Professor, 4. Dr. Rajashekar Sangur, Professor and Head, Department of Prosthodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh.

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Corresponding author:

Dr. Shweta Saini
Post Graduate Student
Rama Dental College-Hospital and Research
Centre, Kanpur
Email: dr_shweta2010@yahoo.com

How to cite this article: Saini S, Singh R, Mahajan T, Sangur R. Replacement of Missing Tooth in Maxillary Esthetic Zone Using Loop Connector -A Case Report. J Dent Res Updates 2014 Dec;1(1):46-49

Sources of support: Nil

Conflict of Interest: None declared