

Case Report**An Aesthetic Management of Missing Maxillary Central Incisor with Loop Connector: An Endodontic - Prosthodontic Approach****Diptesh S. Rami¹, Setu Bavaria², Rajesh Sethuraman³, Nimisha Shah⁴, Noopur Agrawal⁵, Kishan Detroja⁶**^{1,5,6}Post Graduate Student, Professor³ Department of Prosthodontics, Crown and Bridge,

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ABSTRACT

One of the most challenging and complex treatment modality is replacement of single anterior tooth. This can be overcome by different treatment options such as implant-supported restorations as well as conventional porcelain-fused-to-metal and resin-bonded fixed partial dentures. Drifting of teeth into the edentulous area may reduce the available pontic space; whereas a diastema existing before an extraction may result in excessive mesiodistal dimension to the pontic space. Although rarely used loop connectors are sometimes required to address this problem of excessive mesio-distal width pontic space. Loop connector Fixed Dental Prosthesis (FDP) may be the simplest and best solution to maintain the diastema and provide optimum restoration of aesthetics. This case report describes the procedure for the fabrication of a loop connector FDP to restore an excessively wide anterior edentulous space in a patient with existing spacing between the maxillary anterior teeth.

Introduction

Replacement of anterior teeth can often poses a challenging task due to high esthetic demand. Many treatment options like Implant supported fixed partial denture, conventional porcelain fused to metal restorations as well as resin bonded fixed partial denture can also prove quite beneficial, but in cases where excessive mesiodistal pontic space is present, the treatment modality is changed¹ or has limited treatment options to restore the edentulous space. The use of conventional fixed partial denture (FPD) to replace the missing tooth may result in wider teeth which cause poor esthetics². Connectors are the portion of a fixed dental prosthesis that unites the retainer and pontic (GPT 8)³.

The connector may be rigid or non-rigid. Loop connector is mainly indicated in patients where the generalized

diastema is existing between the anterior teeth and it is to be maintained in the final fixed prosthesis⁴. Such cases can be treated with implant supported prosthesis or fixed dental prosthesis using a loop connector.^{4, 5}. Implant supported prosthesis can be used but it may be expensive and time consuming for the patients². In loop connectors, the connector is in the form of loop on the lingual aspect of the prosthesis⁶. This case report describes the technique to fabricate a three unit Fixed Dental Prosthesis with the incorporation of palatal loop connector for maximum esthetic and functional

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rehabilitation of patients with diastema between central and lateral incisor with missing central incisor.

Case Report

A 26 year old male patient reported to the department of Prosthodontics, Crown and Bridge, K. M. Shah Dental College and Hospital, Piparia, Waghodia, Vadodara, Gujarat, India for the replacement of his artificial prosthesis due to unaesthetic appearance. His past dental history revealed that he had generalized spacing between maxillary anterior teeth. The patient had no significant medical history. He already had an existing prosthesis which was a three unit fixed dental prosthesis with acrylic facing. Some part of the acrylic facing was chipped off from the metal bridge. So patient wanted replacement of the fractured prosthesis. It was planned to remove the existing prosthesis and replaced it with a new three unit fixed dental prosthesis. Before removal of prosthesis, a diagnostic impression was taken with irreversible hydrocolloid impression material (Imprint alginate, Dental Impression Material, DPI, India) and the casts were poured with dental plaster (Kalabhai Karson, Batch No. 31105; Mumbai, India). After the removal, the right lateral incisor was found be carious (Fig. 1a). The patients was referred to the Department of Conservative dentistry for the opinion regarding the same.

On Electric pulp vitality test and heat test of right lateral incisor showed delayed response which indicated the necrosis of the pulp of that tooth. After removal of caries, the height of the clinical crown was less (Fig. 1b). Hence, there was a need to build the tooth structure with post. So, the root canal treatment was carried out followed by placement of esthetic post

and core buildup (Fig. 2, refor post, angelous). After that patient was referred back to department of Prosthodontics for fixed dental prosthesis (Fig.3).

The anterior edentulous space was large; there was a partial spacing present between anterior teeth. There were three treatment options left:

1. Three 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)¹.

Mock up restoration with conventional FDP and with the incorporation of 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 taking the approval from the patient, the FDP with loop connector was selected as the treatment of choice with maxillary right lateral incisor and left central incisor as an abutment and right central incisor as a pontic maintaining the diastema between the anterior teeth.

Shade selection was done followed by tooth preparation with intracrevicular finish line. Gingival retraction was carried out with #00 retraction cord (Ultra pack, South Jordan) (Fig. 4). The impression was made with elastomeric impression materials using putty wash two stage impression technique(Honigum, DMG, Hamburg, West Germany) (Fig. 5). Coping trial was done (Fig. 6). Porcelain buildup 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 and then, luted with resin modified glass ionomer cement.

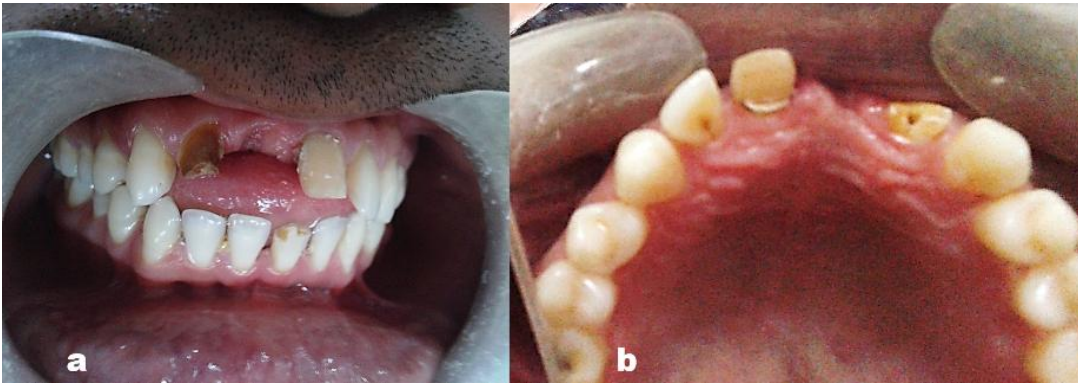


Fig. 1. Carious right lateral incisor after bridge removal

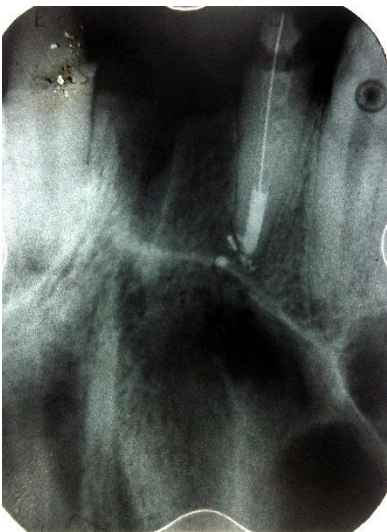


Fig. 2. Placement of refor post



Fig. 3. Core build up done with insertion of refor-post



Fig. 4. Tooth Preparation and Gingival retraction done.



Fig. 5. Putty wash two stage Impression made with Putty-Light body



Fig. 6. Coping trial

The excess cement was removed from the margins of the prosthesis (Fig. 7).

The Pre-operative and Post-operative photographs are shown in Fig. 8. Oral hygiene instructions were given to the patient. Interdental brush was prescribed for maintenance of hygiene between the prosthesis.

Discussion

Connector joins different parts of the FDPs. Their design determines the health of the periodontal ligament under the FDPs. They may be rigid or non-rigid. The understandably rigid as compared

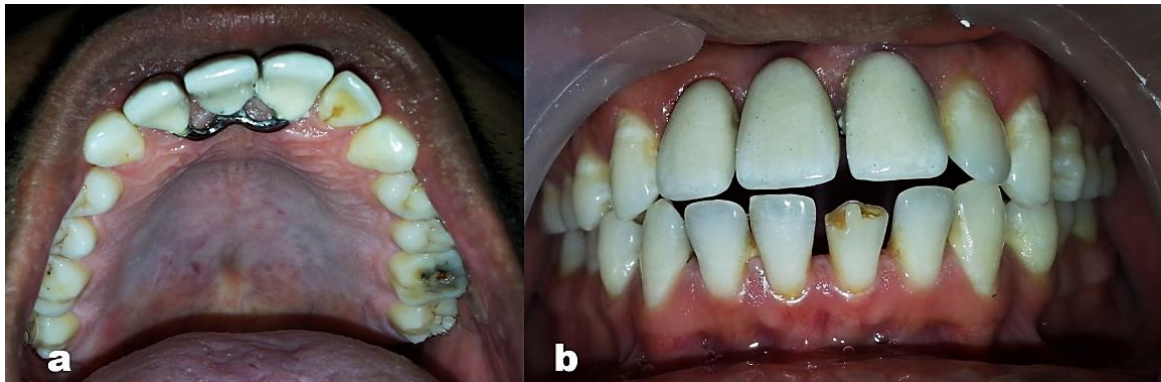


Fig. 7. Final cementation of Loop connector Fixed dental prosthesis
a. Palatal View. b. Facial View



Fig. 8. Pre-operative and Post-operative view

presence of missing central incisor with wide pontic space is a difficult esthetic problem to solve with conventional FDPs². The only viable option available to maintain spaces in FPDs is with the aid of loop connectors, which is both esthetically and mechanically challenging. Conventional FDP connectors are more to loop connectors. This flexibility of loop connectors can relatively be overcome by using shorter lengths and increasing the diameter of the loop, and if possible, still keeping their form as round as possible^{7, 8}. These

connectors are reportedly over contoured, and are therefore difficult to clean off the plaque⁹.

The loop connectors will help in maintaining the diastema between teeth for the aesthetic reason but it also has some disadvantages like food lodgment and interference in tongue movement and speech. It may cause difficulty in maintaining the good hygiene. Bhandari S., Bakshi S⁸ conducted a study on Survival and complications of unconventional fixed dental prosthesis for maintaining diastema and splint pathologically migrated teeth. 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 1 year of prosthesis delivery. Only one FDP 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. 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

There are different treatment options available to replace a single missing anterior tooth such as the dental Implants, conventional fixed partial dentures, resin bonded bridges and removable partial dentures. Use of loop connectors help to maintain the diastema and uniform spacing between the anterior teeth which

enhance the esthetics, especially in case of excessive mesiodistal space in the pontic area. 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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