A Simple Solution to Maintain Emergence Profile of Maxillary Anterior Zone using Loop Connector Fixed Dental Prosthesis

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ABSTRACT

One of the most difficult jobs for the Prosthodontist is to restore the missing anterior teeth, presents with diastema. In patients with interdental spacing; conventional porcelain fused metal fixed dental prosthesis become impossible to restore the missing teeth. However, this spacing can be maintained in the restoration with Implant supported fixed prosthesis or resin bonded fixed dental prosthesis or fixed dental prosthesis with loop connectors. Less Pontic space or too much Pontic space challenges prosthodontist to restore the teeth with conventional fixed dental prosthesis. Considering patient's esthetic requirement of maintaining interdental spacing loop connector becomes a choice for the treatment. These loop connectors might be the best solution to enhance the natural appearance of restoration, maintain the interdental spacing and proper emergence profile. This case report describes the conservative approach for the fabrication of a loop connector FDP to restore an exceptionally wide anterior edentulous space in a patient with existing spacing between the maxillary anterior teeth.

KEYWORDS: Loop connector, diastema, eduntulous space, fixed partial denture, anterior spacing

INTRODUCTION

The necessity for replacing missing teeth is apparent to the patient when the edentulous space is present in the anterior region of the mouth as well as in the posterior region[1], but replacement of anterior teeth along with the excessive space is a challenging task due to high esthetic demand[2]. In this type of cases, there are various treatment options like Removable partial denture, implant supported fixed dental prosthesis and conventional fixed dental prosthesis[3] but in patients with excessive edentulous space treatment modalities are changed or limited treatment options to restore the missing teeth. Implant supported fixed dental prosthesis may be used in the oral rehabilitation of partially edentulous patients but may be expense and time consuming for patient with required many local and medical factors for a successful treatment option. Replacement of missing teeth with the conventional fixed dental prosthesis might result in wide teeth which cause poor esthetics. In order to maintain the diastema with conventional fixed dental prosthesis, loop with the connector becomes the best treatment option for fixed dental prosthesis. Connectors are the portion of a fixed dental prosthesis that unites the retainer and pontic (GPT 8)[4]. 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 prosthesis[5, 6]. This clinical case report describes a conservative approach to fabricate 04 units FPD with three-quarter crowns on the canines instead of full coverage crown with the incorporation of loop connector on the palate for maximum esthetic and functional rehabilitation of patient's diastema between lateral and central incisors and between missing central incisors.

CASE REPORT

A 35-year-old male patient with chief complaints of missing upper anterior teeth due to trauma reported at the department of Prosthodontics, K. M. Shah Dental College and Hospital, Vadodara, Gujarat. The maxillary laterals incisors and canines on both sides found healthy. His past dental history revealed that he had generalized spacing between his upper anterior teeth and his medical history was non-contributory. Clinical (Intraoral and extra oral) and radiological examination revealed the 12, 13, 22, 23, missing 11, 21 [Figures 1 and 2]. The treatment options with inclusion of an implant-supported prosthesis, FPD with loop connectors, resin bonded FPD. Before starting the treatment, 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). The anterior edentulous space was large; there was a partial spacing present between anterior teeth. There were two treatment options left:

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Fig 1. intra oral view

Fig 2. Extra oral view

1. Three unit fixed dental prosthesis with rigid connector
2. A loop connector fixed partial denture

Mock up restoration with conventional FDP and with the incorporation of loop connector was done and shown to the 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.

The following clinical and lab procedures were carried out for his oral rehabilitation:

Full veneer teeth preparation for porcelain fused to metal was done on 12, 22 and three quarter teeth preparation was done on 13, 23(Fig 3). The shoulder finish lines of the preparation were kept equi-gingival in order to enhance the esthetics as it prevents the color of the metal from showing thorough translucent enamel and grooves with inverted cone diamond point were prepared. The gingival retraction was carried out with #00 retraction cord (Ultra pack, South Jorden). The impression was made with elastomeric impression materials using putty wash two stage impression technique (Honigum, DMG, Hamburg, West Germany) (Fig. 4) and poured in Type IV dental stone. Master casts were retrieved and die cutting was done with Pindex die system. Sawing of the model for separation of dies and ditching the die (to reveal

Fig 3. Full coverage tooth preparation on 22,12 and three quarter tooth preparation on 13,23

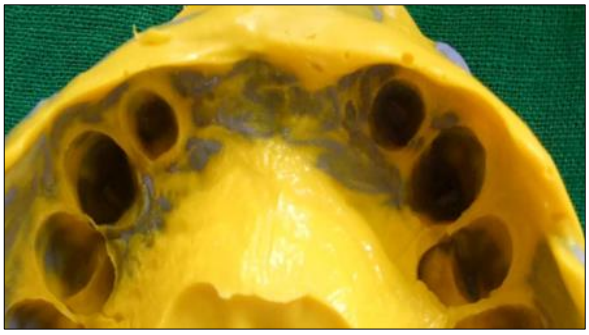

Fig 4. Two stage Putty Light body wash impression

preparation margins) removed critical anatomy which would help guide the creation of optimal restoration contours. To overcome this problem soft tissue masque was fabricated with polyvinylsiloxane light body material. A quick-setting rigid poly vinylsiloxane interocclusal recording material was used to record the maxillomandibular relationship. The provisional FPD was fabricated and cemented using non-eugenol cement. Casts were mounted on a semi-adjustable articulator (Hanau H2) using a face-bow transfer. Wax sheet with 0.5 mm thickness was placed on the edentulous ridge to create a space to allow convenient access for oral hygiene. Coping trial was done followed by shade selection (Fig. 5). Porcelain build up of the selected shade

Fig 5. Metal try in

was done, and the prosthesis was glazed. A mutually protected occlusion was planned for the longevity of the prosthesis and confirmed at the final stage of a bisque

trial (Fig. 6). The aesthetic appearance of the final prosthesis was confirmed with the patient and on the cast with soft tissue replica technique (Fig. 7) and then, luted with resin modified glass ionomer cement (Fig. 8,9,10).

Fig 6. Bisque trial

Fig 7. Esthetic appearance confirmed with soft tissue replica

Fig 8. Cementation of FDP with GIC

Fig 9. Post Cementation view

Fig 10. Post Operative View

This prosthesis design may decrease access for plaque removal because palatal connectors are over-contoured by design. The patient was instructed to maintain the proper oral hygiene. Use of dental floss (Superfloss; Oral B, UK) and interdental brush (Interdental; Oral B) were recommended to the patient. The patient was evaluated after 1 week to assess the oral hygiene status.

DISCUSSION

There are 3 components in the fixed dental prosthesis; pontic, retainers, and connectors. Connectors are the part of fixed partial denture that connects the retainers with the pontic. They may be either rigid or non-rigid. The reasonably rigid as compared presence of missing central incisor with wide pontic space is a difficult esthetic problem to solve with conventional FDPs[7]. The presence of the missing central incisors with a wide span is a difficult esthetic problem to resolve with conventional FDPs. The natural appearance of the restoration enhanced by the FDP modified with loop connector. The diastemas and the proper emergence profile maintained by loop connector FDP and it helps in the preservation of the remaining tooth structure of abutment teeth[8]. FDP modified with loop connector is only feasible option to maintain spaces in FDPs, 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[9, 10]. These connectors are reportedly over contoured, and are therefore difficult to clean off the plaque[11].

The loop connectors will help in maintaining the diastema between teeth for the aesthetic reason, but it also has some disadvantages like food lodgement and interference in tongue movement and speech. It may cause difficulty in maintaining the good hygiene. Bhandari S., Bakshi S[10] conducted a study on Survival and complications of an 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 up 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. 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 deposition of calculus 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. The new prosthesis was made after increasing the diameter of the loop while keeping the length and circumferential form the same. Two female patients were there who had experienced multiple problems after prosthesis delivery desired to have a new prosthesis with closed spaces. The 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, FDPs modified with loop connector is an excellent treatment option in cases where unwarranted space is present, to maintain the midline diastema is a viable and suitable treatment option.

CONCLUSION

Treatment planning is very critical to success when considering any form of tooth replacement. Finalized treatment modality should suit patient's need. The use of loop connectors in the fixed dental prosthesis treatment, presents a straightforward way to fabricate a convincing prosthesis for the patient.

The esthetic advantage of such prosthesis certainly outweighs the presence of the lingual metallic loops in the patient's mouth.

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