

CASE REPORT

Loop Connector : A Simple Solution To Achieve Optimal Aesthetics Maintaining Diastema

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Abstract

The replacement of a single missing maxillary central incisor has always been considered as a unique prosthodontic problem from aesthetic as well functional point of view. Replacement of single anterior tooth is a complex, challenging procedure that can be accomplished with implant-supported restorations as well as conventional porcelain-fused-to-metal and resin-bonded fixed partial dentures. Different aesthetic treatment options must be explored in treating such patients. In cases with midline diastema and interdental spacing, the option of a fixed partial denture with conventional design becomes impossible to use. The excessive mesio-distal pontic space may limit the option to implant supported restorations. Loop connectors offer a simple solution for a situation involving an anterior edentulous space with the maintenance of the diastema. This article presents a case with excessive space in the anterior region treated with a loop connector to achieve ideal aesthetic results in the maxillary anterior region.

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Introduction

Replacement of single anterior tooth can be achieved through different options viz dental implants, resin bonded bridges, conventional fixed partial dentures. Patient's exacting demands, on many occasions defeat the possibility of ideal treatment. In some cases, adapted treatment plans have to be tried. The

need for replacing missing teeth is obvious to the patient when the edentulous space is in the anterior segment of the mouth, but it is equally important in the posterior region¹. Nearly 80% of the young subjects in the study by Tjan et al displayed the entire length of the maxillary anterior teeth.

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Upadhyay et al.

Women show nearly twice as much maxillary central incisor as men (3.4 to 1.9 mm, respectively) with the upper lip at rest and men are 2.4 times more likely to have a low smile line than women². So to contribute to a pleasing facial appearance particularly when patient smiles, contours, size, incisal edge, occlusal plane and midline must be in harmony while replacing teeth in the appearance zone³.

Loss of tooth normally results in drifting of the adjacent teeth and consequent narrowing of the pontic space. However a greater difficulty in replacement of the tooth results when there is either flaring of the teeth or diastema or interdental spacing which is present before the loss of the tooth. This contradicts the use of conventional fixed partial dentures without compromise in aesthetics. Although implant supported restorations have now become a mainstay treatment option, certain alternatives may be available for the said problem. In this article, a case is reported where maxillary central incisor was replaced with fixed dental prosthesis incorporating dual loop connectors. This clinical report deals with the treatment of using modified FPD with palatal loop connectors to restore the missing central incisor for a patient with generalized diastema.

Case report

A 26-year-old male patient reported to the Department of Prosthodontics, with a missing right maxillary central incisor. The patient gave a history of trauma due to a fall from a bike over two years ago and subsequent avulsion of the tooth. His primary concern was that of achieving

optimal and natural aesthetics. On examination, the anterior edentulous space was considerably larger mesio-distally than the contra-lateral maxillary central incisor [Fig 1].



Fig 1- Pre-operative intraoral showing large mesio-distal space with respect to
11

A single tooth implant was a viable alternative as it would allow a restoration maintaining both the mesial and distal diastema. Due to the presence of a labial concavity a graft would have been mandatory for implant placement and an aesthetic prosthesis. However, the patient was not willing for surgery for implant placement and wanted an immediate fixed alternative for the central incisors. Hence an alternative treatment plan incorporating a loop connector fixed partial denture was considered. This would allow the maintenance of the diastema and yet achieve excellent aesthetics while giving a fixed treatment option to the patient.

Procedure

Diagnostic impressions were made in irreversible hydrocolloid and casts were poured in dental stone type III. Inter-occlusal records were made in Alu-wax and a face-bow transfer was made and the casts were mounted on a semi-adjustable articulator. Two diagnostic wax-ups were

made. In the first mock-up no diastema was kept between the adjacent teeth. In the second mock-up a fixed partial denture was designed with a loop connector to make the replacement aesthetic and in accordance with the overall appearance and alignment of his other teeth. Both the mock wax-ups were shown to the patient. The patient approved the second wax up that was designed with a loop connector. [Fig 2]



Fig 2-
Wax
Mock Up

Following this, tooth preparation of the right maxillary central incisor and left maxillary lateral incisor was carried out to receive Porcelain-fused to metal restorations [Fig 3]. Two retainers were preferred for improved support and retention. Gingival retraction was carried out and final impressions were recorded with Putty-wash technique using addition silicone [Fig 4]. A final working cast was made in Type IV dental stone. A provisional restoration was fabricated for the patient with Cool temp. Final wax pattern incorporating loop connectors, was made on the working cast



Fig 3-
Tooth
preparati
on



Fig 4.
Impressio
n made
with
putty
wash
technique

A second cast with removable dies allowed further refinement. The two retainers were connected by a minor connector, which was extending on to the rugae area, in the valleys of the rugae. The dimension of the connector was 2 mm with a circular cross-section and with a relief provided by using 0.2 mm relief wax. The casting was then completed and a coping trial was tried in the mouth. After verifying the fit of the casting, [Fig 5] ceramic build up was completed and the bridge was cemented similar to conventional fixed partial dentures.



Fig 5.
Coping
Trail

Care was taken to remove any interference on the final prosthesis. The

patient was highly satisfied with the treatment. [Fig 6].



Fig 6.
Post
operative
intraoral
photograph

Discussion

The presence of missing central incisor in the patient with diastema is a difficult aesthetic problem to resolve with conventional FPD's. The modified FPD with loop connectors enhance the natural appearance of the restoration, maintain the diastema and the proper emergence profile and preserve the remaining tooth structure of the abutment teeth⁴. The prosthesis design may cause difficulty in maintenance and may effect in phonetics especially linguo-palatal sounds. However keeping the connectors round and small in size will not affect the phonetics. 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^{5,6}. Also connector geometry affects the strength of ceramic materials^{7,8}. Therefore smoother, less angled and more round connectors should be kept for lower stress levels⁹.

The incorporation of a loop connector in this design allowed the patient to be given an excellent esthetic outcome without compromising the functionality of the restoration. Thus, loop connectors have several advantages when it comes to the aesthetic appearance. Maximum aesthetic results is obtained if the natural anatomic forms of teeth are protected and the diastema are maintained with minimal over-contouring of the adjacent

teeth¹⁰. However in some cases, the patient might object to projecting minor connector in the palatal region, and it might be a potential food trap for the patient.

Conclusion

The main objective of aesthetics was achieved and the patient was very pleased with the outcome. 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 in the aesthetic zone. The final restoration exhibited excellent form, function and aesthetics giving natural appearance to the patient.

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