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Bilateral Cantilever Bridge: A Treatment Option to Achieve Optimal Esthetics to Overcome Diastema

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Case Report

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Abstract: Esthetic tooth replacement is a challenging procedure for the dentist, patient, and technician. Loss of the anterior teeth with existing diastema may result in excess space. Various treatment options are available for the replacement of multiple anterior teeth. These options include partial removable dental prosthesis (RDP), an implant-supported prosthesis, and conventional fixed dental prosthesis (FDP). FDP, along with loop connector, is the best treatment option but not on those with limited interocclusal space and with deep bite. The cantilever FDP with canine and lateral incisor is the proper choice for such case. The cantilever FDP design enhances the natural appearance of the restoration and proper contour, emergence profile, and dental forum. This clinical report describes a technique that fabricates a bilateral three-unit metal ceramic (MC) cantilever FDP to achieve optimal esthetics and functional correction for patients with missing maxillary central incisors along with diastema in between central incisors.
Keywords: Cantilever bridge, Loop connector, Metal ceramic, maxillary diastema.

INTRODUCTION

Multi-unit FDPs, such as a conventional bridge, a resin-bonded bridge, and a solitary implant-supported MC crown, are the treatments of choice for replacing missing teeth. Esthetic replacement of maxillary teeth has always been a prosthodontic challenge for the dentist, patient, and dental technicians. Treatment selection strongly depends on the specific characteristics of the patients' dentition, his/her preferences, and financial status [1, 2].

Applying palatal loop connectors [3, 4] or multi-palatal loop connectors [5-8] can restore the missing maxillary incisor teeth with diastema. Others prefer the palatal spring loop connectors or a spring cantilever bridge, which comprises a pontic that is directly connected to its retainer(s) as fixed-fixed, fixed-movable, or cantilever bridge by a relatively long flexible palatal loop connector [9, 10]. All previous options had some disadvantages, such as gingival irritation, food debris accumulation, and difficulty in practicing proper oral hygiene. In addition, they cannot be used in those patients with deep anterior bite and short clinical crowns [11-13], and may also affect or interfere with phonetics, especially linguo-palatal sounds [8].

The use of maxillary cantilever bridges (canine as an abutment) is strongly recommended to replace maxillary lateral incisors with the presence of other factors, such as adequate clinical crown length, wide root configuration, and sufficient surface area of the periodontium, as described in the Antes Low [11, 12]. It should not also interfere with the normal articulation of the patient. This clinical case report describes a technique that fabricates a bilateral three-unit metal ceramic (MC) cantilever FDP to achieve optimal esthetics and functional correction for a patient with missing maxillary central incisors along with diastema existing between the central and lateral teeth before their extraction.

CASE REPORT

A 23-year-old male patient was referred to the Department of Prosthodontic Dental Science for evaluation and treatment. His chief complaint was the discoloration of his right maxillary anterior teeth and the need to replace his left maxillary central incisor. The patient was medically fit. He had a football accident that resulted in tooth extraction 6 months ago. He failed to have regular dental checkup, did not brush his teeth daily, but used miswak sometimes.

Intraoral soft tissue was normal. The maxillary and mandibular arches were U-shaped. The maxillary right central incisor (teeth #21) was black due to trauma 5 years ago. Moreover, the existing dentition was normal with slight localized marginal gingivitis along the left maxillary and mandibular teeth due to khat chewing (Figs-1A & 1D). The edentulous area was wide mesiodistally, and a space was noted between

maxillary anterior teeth. Occlusal dental caries were detected on some posterior teeth. The pretreatment panoramic radiograph showed finely woven, dense, normal trabecular bone pattern (Fig-2A). The periapical X-ray for the abutments showed internal resorption of tooth #21 and the remaining root of tooth #11, and reasonable crown–root ratio with favorable root configurations (Fig. 2B). During the extraction of tooth #21 and the remaining part of tooth #11, diagnostic impressions were made using irreversible hydrocolloid and dental stone. Pouring of the impressions and diagnostic mockup were performed on the cast.

For the succeeding appointments, the treatment options include partial RDP, implant-supported prosthesis or FDP with the aid of loop connector, resin-bonded FDP, and bilateral cantilever FDPs with lateral incisors and canines in both sides as abutments; all were discussed with the patient. The treatment option of six-unit MC FDP from right to left maxillary canine with intermittent loop connector was considered. The abutment tooth preparations for MC prosthesis were performed on maxillary right canine with lateral incisor and left canine with lateral incisor with slight subgingival margin finish line for esthetic enhancement. Exposure of the finish line and gums was obtained with gingival retraction cord, and final maxillary impression was obtained with the addition of silicon (Virtual Ivoclar Vivadent, Lichtenstein) by using two-stage techniques (Fig-3A). Pouring the impression was completed with improved stone (BEGO/Germany). Then, from the rubber base index which was prepared earlier from the diagnostic mockup cast, provisional bridge was constructed by using Success SD (Promedica, Neumuenster, Germany) and finally cemented with temporary cement (Temp-Bond NT, Italy). From the master cast, the dyes were ditched, and then wax-up was performed for the six-unit bridge with a loop connector. The wax pattern was applied with phosphate-bonded investment material and casted with nickel-chromium base metal casting alloy (Wiron 99, Bego, Germany). During the metal try-in of maxillary anterior MC bridge, the loop connector was interfered by the opposing natural teeth due to limited interocclusal space (Fig-3B & 3C), thus modified to remove the palatal loop connector. The new tried FDPs were bilateral cantilevers with canine and lateral incisors as abutments. The shade was selected by the patient and the dentist by using 3D master. The porcelain VITA VM(R)9 (VitaZahnfabric/Germany) was used for porcelain build-up. All the laboratory procedures were performed in accordance with the manufacturer's instructions.

On the next appointment, the two bilaterally separated FDP cantilever bridges were seated on their abutments and adjusted in the patient's mouth. The occlusion was adjusted during centric and eccentric movements. The canine guidance was verified at both sides before glazing and cementation of the bridges (Fig-4A & 4B). The cement used was modified glass ionomer-type cement (Relaxy, 3M ESPE, Germany). After a week, the patient's oral hygiene status was assessed and subjected for regular checkup. A conventional bilateral cantilever FDP was opted out because the space was large and existed between his anterior teeth. Finally, the diastema was closed.

Fig-1: Preoperative intra-oral view

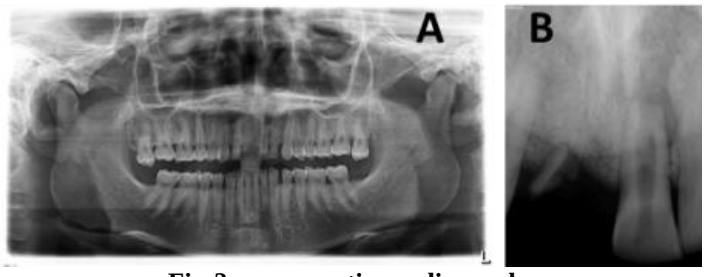

Fig-2: preoperative radiographs

Fig-3: During clinical and laboratory steps.

Fig-4: Postoperative view

DISCUSION

A conventional bilateral cantilever FDP was opted out because the space was large and existed between his anterior teeth. Finally, the diastema was closed. This case report presented a 23 year-old young patient with missing central incisors with bilateral cantilever bridges, involving canine and lateral maxillary teeth as abutments. This case is completely consistent with other research [14] that anterior ceramic cantilever bridge efficiency can excellently last for 10 years.

Patients with bilaterally missing maxillary central incisors along with diastema have limited treatment options to restore the edentulous space. The use of a conventional FDP with bilateral incisors as abutments to replace the missing central teeth may result in considerably wide anterior teeth mesiodistally, leading to poor esthetics and inadequate biomechanics of both abutments [6, 11]. To overcome this problem, an additional bilateral abutment should be added to involve both canines in the maxillary arch for prosthesis survival and structural durability. In the presence of canine teeth, we always advised for cantilever in some certain conditions, such as long teeth, to result in a favorable abutment–pontic ratio and absence of deep bite [11]. Given that no contact is noted with the opposing teeth in the anterior region during different eccentric movements, we strongly recommended the cantilever FDPs in this patient with canine teeth [12, 13].

Using of loop connector and spring connectors is rarely practiced, but it is an excellent alternative treatment option in cases with diastema and interdental spacing of maxillary anterior teeth. However, application of this option is limited when factors, such as limited interocclusal space and occlusion of the lower teeth in the rough area, are present [11-13]. Other disadvantages include additional laboratory procedures,

some difficulty to maintaining oral hygiene, interference in tongue movement, and discomfort in speech [15].

The clinical significance of this case is that the involvement of the maxillary canine teeth in the design of the bridge resulted in an excellent esthetics with proper tooth mesiodistal width distribution. The patient greatly appreciated the final outcome because the restoration achieved excellent form and function. The patient can maintain proper oral hygiene, and favorable results were achieved in a short period of time. Furthermore, symmetry in the contours and shape of interior teeth was apparent.

CONCLUSION

To replace a missing maxillary anterior tooth with diastema, different treatment options are available, such as the implants, partial RDPs, and conventional FDPs with loop connectors and spring cantilevers. Loop connectors with FDPs are sometimes required when an existing diastema is to be maintained in planned FDPs. This paper has described a different type of FDPs as bilateral cantilever maxillary anterior bridge for esthetic replacement of missing central incisors, closing the diastema with favorable esthetic results. The patient was greatly pleased with the final outcome as the restoration achieved proper emergence profile and excellent form and function.

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