

Duplication of Canine Guidance Using a Temporary Cantilever Bridge

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ABSTRACT

Duplication of anterior guidance is not difficult, but transfer of the anticipated anterior guidance can be cumbersome, especially in tricky clinical partial edentulous situations where permanent canine is missing. The role of a provisional restoration can be helpful for a clinician to determine whether a conservative approach can be used to fulfil the treatment objectives. Use of a cantilever prosthesis to replace a functional canine is not recommended unless allowed by existing functional occlusion. We present a report of a missing maxillary canine that was used as a model to decide whether a conventional three unit fixed partial denture would be avoided and a cantilever two unit fixed partial denture would suffice. Adjacent maxillary first premolar was prepared for a porcelain fused to metal retainer and a temporary cantilever heat cure denture base acrylic resin was cemented in place. The patient was then asked to perform natural occlusal functions for a period of four weeks. At four week evaluation, there was no significant wear of the temporary restoration nor was any cement failure reported. This clinical technique should be practiced in every case where prognosis is doubtful to a clinician.

INTRODUCTION

Clinical fixed prosthodontics possesses a wide range of Fixed Partial Denture (FPD) options that involves taking support of an abutment tooth. One of the least acceptable option is that of a cantilevered pontic which takes support from only one adjacent abutment [1]. Their use was widespread in dentistry before esthetic porcelain fused to metal retainer was introduced. With little regard to biological principles, the restoration would often result in tooth loss and tissue damage [2,3]. While designing any fixed partial denture, it is imperative to determine whether physiological forces or hostile forces are being transmitted to an abutment tooth [4]. Greater understanding of occlusion has, however improved the possibility of cantilevered fixed prosthesis to be delivered in certain clinical situations that is primarily guided by occlusal factors [1,5]. Clinical situations where cantilever FPD has been recommended include the replacement of a maxillary lateral incisor and mandibular first premolar using adjacent abutment [6].

The existing occlusion is the prime factor that determines the indication as well as the design of a cantilever prosthesis. One such occlusal factor that does not inhibit using a cantilever FPD and has never been reported, is the increased overjet in existing occlusion. This article in the form of a case report presents a case of a missing

maxillary right canine that was successfully replaced by using a cantilever FPD using adjacent maxillary first premolar. The use of the cantilever design is also justified on the basis of the decreased pontic space that was present in the edentulous area.

CASE REPORT

A young female patient aged 30 years reported to the department of prosthodontics for correction of her unaesthetic smile due to absence of front upper teeth. Medical, social and drug related history did not show any negative findings that would impact the current treatment procedures or plan. Dental history disclosed that the patient did not have a front maxillary right canine since childhood and could not tell much about past dental status. The patient was practicing average oral hygiene maintenance measures that included regular brushing and toothpaste. Extra oral examination revealed a short maxillary lip with a somewhat straight facial profile. Intra oral examination revealed maxillary right canine missing due to which the right lateral incisor had shifted palatally and distally while the maxillary right first premolar had developed a medial rotation of the palatal cusp (Figure 1).



Figure 1: Missing right maxillary canine with migration of both lateral incisor, first premolar on the same side while the right side distal surface of the canine shifted lovely.

Occlusal analysis of the patient showed an increased amount of overjet (6 to 8 mm) while the overbite was within the normal range. The canine on the right side showed wear facets at the incisal tip thus demonstrating an effective canine guidance. Diagnostic evaluation of the mounted casts on the programmed

semi adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla) disclosed two areas of concern. Firstly the edentulous space was very less to accommodate a maxillary canine and secondly the left side had naturally developed into a group function occlusion. These two features had a definite impact on the treatment options that were presented to the patient. These included a single implant supported crown to replace missing canine, a conventional three unit fixed partial denture replacing the canine or a maxillary canine cantilevered to the adjacent premolar that would be compatible with the existing occlusion. The last treatment option was subject to verification of the feasibility of such design after appropriate procedures. For all these prosthetic options, the orthodontic treatment was considered mandatory otherwise the width of the canine would have not fulfilled the esthetic requirements. The recommended prosthesis was a ceramic fused to metal or an all ceramic restorations. The patient consented for orthodontic correction followed by a metal ceramic cantilever bridge replacing maxillary right canine.



Figure 2: Temporary cantilever fixed partial denture cemented in place. Note lingual inclination of pontic to avoid interfering with mandibular movement.

After preliminary mouth preparations that included oral prophylaxis and orthodontic correction of the teeth, the maxillary right first premolar was prepared following the principles of tooth preparation for all ceramic crowns. A temporary restoration made of self cure acrylic resin Unifast III (GC Europe), was fabricated and cemented with polycarboxylate cement (Poly F Plus; Dentsply DeTrey GmbH,

Konstanz, Germany) (Figure 2). An irreversible hydrocolloid impression (CA 37; Cavex, Haarlem, Holland) was made after cementation and the poured cast obtained from the impression was preserved for later comparison. The purpose of the temporary was to determine the harmful stresses that could possibly affect the long term health of the abutment and proper functioning of anterior guidance elements. The patient was asked to wear the temporary cantilever fixed partial denture for a period of three months. After three months an impression of the temporary fixed partial denture in place was made with irreversible hydrocolloid (CA 37; Cavex, Haarlem, Holland) and casts were poured which was analyzed and compared to the earlier cast after cementation of the provisional restoration. There was no reporting of either cementation failure nor did the casts reveal any difference on the pontic. Once the feasibility of giving a cantilever prosthesis was determined, regular clinical and laboratory procedures to fabricate a metal, ceramic fixed partial denture were initiated. The final restoration was cemented with zinc phosphate cement (Harvard, Germany) (Figure 3). The patient was put on a frequent follow up for the initial six months after which she has been regularly reporting to the department at least once in a year. The patient was highly satisfied with the treatment outcome of the entire rehabilitation and was able to appreciate the difference between her partial edentulous state and rehabilitated state (Figure 4).



Figure 3: Cantilever design two unit partial denture replacing missing right canine in place.

DISCUSSION

A Kennedy class 3 partially edentulous situation with missing maxillary right canine successfully restored using a metal ceramic cantilevered FPD has been presented. The basis of using the cantilevered prosthesis is the presence of decreased

pontic space in the region where conventional three unit fixed partial denture would have resulted in impaired esthetics due to irregular distribution of mesiodistal width of three teeth. The current design was also possible since there was increased overjet and decreased overbite with less resultant horizontal forces to the FPD. Other treatment options that were presented to the patient in the order of preference were a single implant, resin bonded FPD (including cantilever resin bonded FPD), spring bridge and a conventional three unit FPD.



Figure 4: Preoperative and postoperative photographs.

The use of the resin bonded prosthesis was not preferred since their clinical performance has been reported with both success as well as failures [7,8] with little reports on situations like this. A conventional three unit fixed partial with partial veneer retainer can also be considered [9], but was discarded since the future position of the proximal grooves in that case was not conducive to proper esthetics. This was due to the buccal placement of canine and decreased pontic space. Although advances in dental materials during the past decades have provided other treatment options [10], this case was mainly governed by the decreased pontic space. The pontic space can be increased by orthodontic correction, but due to long treatment and financial restraints, the patient did not consent to orthodontic correction. The design features of Cantilevered FPD that were considered during the completion of this case were based as that described by Goldfogel and Lambert [11].

CONCLUSION

Decreased pontic space where space cannot be regained by patient's limitations should be considered for cantilevered FPD

provided occlusal factors are conducive. Increased overjet and decreased overbite produces a less lateral force on a prosthesis in the anterior region. Other factors that may preclude the use of a cantilevered FPD are a matter of future study.

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