Effect of Different Treatment Modalities on The Supporting Structures of Lower Kennedy Class II cases with Pier Abutment

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بِسْمِ اللّهِ الرَّحْمَنِ الرَّحِيمِ

وَمَا تَوْفِيقِي إِلاَّ بِاللّهِ
عَلَيْهِ تَوَكَّلْتُ وَإِلَيْهِ أُنِيبُ.

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Introduction

A biomechanically acceptable removable partial denture design is essential for proper force distribution on the denture supporting structures particularly in the distal-extension removable partial dentures (RPD). Functional forces applied to the denture base create an axis of rotation around the most distal abutment teeth, subjecting them to distal tipping, rotation, torque and horizontal movement. This situation is more complicated when the most distal abutment is isolated one (pier abutment), as it will be subjected also to mesial tipping due to lack of mesial contact, promoting a fulcrum like situation of mesiodistal torqueing leading to rapid destruction of its supporting periodontium.

Different treatment modalities have been suggested to reduce harmful forces directed to pier abutments. One approach involves the inclusion of the isolated tooth in the removable partial denture design. Functional denture stability, good retention, and satisfactory aesthetics are important factors for a successful treatment with RPD. In addition, the distribution of the functional loads should be optimized among the abutment teeth and the alveolar ridge. The use of only two rests on the pier abtutment has been recommended to reduce the potentially detrimental forces transmitted to the pier abutment supportindg structures. However from an esthetic point of view, there are those who prefer clasping the pier abutment (second

premolar) instead of placing the direct retainer on the canine. The use of only proximal plates on the mesial and distal aspects of the isolated tooth to minimize lateral forces directed to it also has been described in the literature. [1]

Another approach recommended to reduce stresses transmitted to the pier abutment involves splinting to the nearest tooth by a fixed partial denture. Splinting creates an intact dental arch anterior to the free end edentulous space; stabilizes the abutment teeth in a mesiodistal direction and provides multiple abutment support. Moreover, if one of the teeth included in the fixed splint is the canine, or if the splint extended anteriorly around the curve of the arch, the splinted teeth will be stabilized in a facio-lingual direction as well. Thus, fixed splinting minimizes detrimental forces on those abutment teeth, provides improved stabilization and a much better long-term prognosis. [2, 3]

Nowadays the use of dental implants has solved many problems associated with removable partial denture design. Such therapy can result in exceptionally stable, retentive and esthetic restorations that are biomechanically sound and readily maintained. [2] Studies that have investigated the use of implant supported crowns to manage challenging partial denture designs showed that; using an implant in the edentulous space anterior to the pier abutment and restoring it by independent crown has completely eliminated the fulcrum like situation associated with the pier abutment. [4, 5]

Although long term clinical researches have been published evaluating the generalized effect of different distal-extension partial