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Case Report

NON RIGID CONNECTOR IN THE MANAGEMENT OF PIER ABUTMENT – A CASE REPORT

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ABSTRACT

It has been stated that in a fixed dental prosthesis forces are transmitted to the terminal retainers as a result of the middle abutment acting as a fulcrum causing failure of the weaker retainer.[1] A non-rigid connector has been recommended to neutralize the effects of these forces. The movement of the connector although minimal is enough to prevent the transfer of stresses from the segment being loaded to rest of the prosthesis.

Keywords: Connector, Non-rigid connector, Pier abutment, Stress distribution.

INTRODUCTION

Variables that influence longevity of Fixed Partial Denture (FPD) and its abutments include occlusion, span length, bone loss and condition of the periodontium. The excessive flexing of a long span FPD which varies with the cube of the length of the span, can lead to material failure of prosthesis or an unfavourable response[2]. Usually rigid connectors are the preferred way of fabricating most fixed partial dentures. Rigid connectors provide good strength and stability to the prosthesis while minimizing stresses. There are situations where a non rigid connector is indicated.

1. Lone free standing abutment (pier abutment) with edentulous spaces on either side allowing physiological tooth movement and relieve stress.
2. When it is not possible to prepare two abutments with common path of placement.
3. When there is uncertainty of prognosis of an abutment and if the abutment fails only a portion of the FPD needs to be remade.
4. In the mandibular arch, FPD consisting of anterior and posterior segments, a non-rigid connector is indicated as the mandible flexes mediolaterally during opening and closing strokes[3].
5. Disparity in retentive capacity of the abutments.

CASE REPORT

A 38 years old female patient came to the Department of Prosthodontics, Swargiya Dadasaheb Kalmegh Smruti Dental College and Hospital, Nagpur with a chief complain of difficulty in mastication on right side. Patient was co-operative and well oriented to time, place and person. Medical history was not significant. On intraoral examination, it was found that first premolar and first molar were missing in the upper right quadrant (FIG 1.)The intraoral periapical radiograph revealed good bone support in canine, second premolar and second molar region. Considering the age, bone support and requirements of the patient, treatment plan was decided to do the restoration of missing teeth with Fixed Partial Denture (FPD) of non-rigid type design. The non-rigid connector design to be used consisted of ball-shaped key(also called tenon) attached to the second premolar and a dove tail keyway placed within the contours of the retainer placed on the mesial aspect of the first molar during the wax pattern fabrication.

TREATMENT

Informed consent was taken from the patient. The tooth preparation for the abutments was done followed by the impression procedures and master cast fabrication.(FIG 2). The non-rigid connector design to be used was prepared in the wax pattern. Accurate alignment is very much critical. It must be parallel to path of withdrawal of the distal retainer. Paralleling was accomplished using a surveyor.[4] After the prepared wax pattern casting was done and a rubber sleeve is placed in the mesial dovetail keyway (also called mortise). (FIG 3) a trial of the fit of individual units was done to verify proper seating on both buccal and palatal side (FIG 4.1 and fig 4.2) then ceramic was added to the retainer (FIG 5). At the time of cementation, first the mesial unit segment was placed

and the distal unit was cemented afterwards. No cement should be placed in the keyway. (FIG 6)

SUMMARY

The size, shape and type of connector play an important role in the success of a FPD. Biomechanical factors such as overload, leverage, torque and flexing induce abnormal stress concentration in an FPD. Stress concentration is found in the connectors of the prosthesis and near the cervical dentin near the edentulous ridge. When a non-rigid connector was incorporated at distal region of the pier abutment, the area of stress concentration in pier abutment was reduced.[5] Botelho and Dyson reported that rigid FPDs with pier abutment are associated with higher debonding rates than short span prosthesis [2]. Thus, these restorations may result in marginal leakage and caries [2]. Non-rigid connectors are suggested as a solution to these problems [2,6]. This factor plays an important role in the potential for failure in long span FPD. The conventional use of non rigid connector aids in compensating the difference in resistance and retention form between the abutments.

CONCLUSION

The size, shape and type of connectors play important role in future success of a FPD.[7] The selection of proper connector is important step in treatment planning of pier abutment. Non-rigid connectors transfer less stress to abutments also allowing physiologic tooth movement. Thus, the design and passive fit of non-rigid connectors is significant to success of a long span fixed partial denture.

Figure 1: Pre operative view.

Figure 2: The tooth preparation of the abutments

Figure 3: Cast Wax pattern

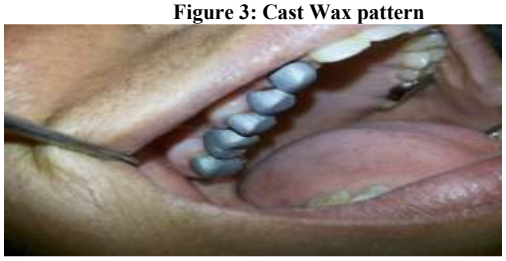

Figure 4.1: Trial fit for buccal view

Figure 4.2 Trial fit for palatal view

Figure 5: Addition of the ceramic

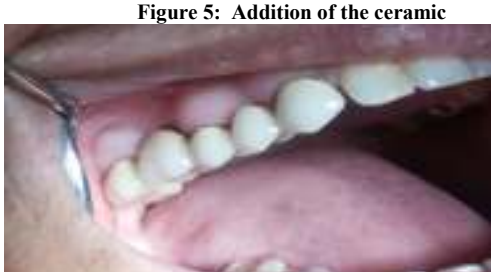

Figure 6: Post operative view.

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