

Minimally Invasive Restoration Innovations: About Resin Bonded Bridges

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Introduction

Resin bonded fixed partial denture (RBFDPs) have been in use for over 30 years, since the concept was first introduced in the 1970s. They have provided a conservative medium-term restoration. Initially, these restorations failed through frequent debond but advancements in technology (treatment of the fitting surface and bonding techniques) have improved their predictability^[1]. A careful case selection is important to predict esthetic and functional restoration with medium or long-term survival. Abutments should be vital and aligned showing sufficient enamel available for bonding and should coronal length which is favorable for retention. A detailed assessment of both static and dynamic occlusal relationships is crucial to optimize success. It is important that the pontic is not involved in guidance during mandibular extrusion movements^[2].

From Metal to Ceramic RBFDPs

The typical design RBFDPs is characterized by a high degree of conservation of tooth structure of abutments compared with designs of conventional fixed prostheses. In 1973, Rochette introduced the idea of bonding a cast metal bar to the lingual surfaces of periodontally involved anterior teeth for splinting purposes using the acid-etch technique and an unfilled resin cement. The cast metal splint had perforations to permit attachment to the resin cement through mechanical interlocking. The idea was applied by Howe and Denehy in 1977 to a specially designed partial denture to the enamel of abutment teeth in the anterior segments of the mouth. Since that time, a number of significant modifications to this original design have improved its longevity in the oral environment. Livatidis proposed abutment preparation of proximal and lingual surfaces to create tissueward displacement of the retainer. Placement of vertical grooves in the mesial and distal surfaces of the abutments was suggested to further enhance resistance to lateral displacement^[1,3]. Current advancements involved the inclusion of all-ceramic systems to eliminate the metal framework and reduce the disadvantage of metal inclusion mainly the unaesthetic metal appearance in the proximal areas. The preparation of abutments for ceramic RBFDPs seemed to be simplified and limited to palatal and proximal areas without any grooves.

Conventional or Cantilevered RBFDPs?

For RBFDPs, both dual retainer and the cantilever framework design were suggested. If selecting a three-unit design, both abutments should have similar mobility, otherwise the weakest may detach from the enamel, compromising the entire result. After orthodontic treatment, conventional RBFDP may be desirable because of its double function as a fixed orthodontic retainer^[1]. However, a single abutment-single pontic prosthesis has a reduced biological and financial cost, is easier to prepare, and simplifies impression procedure and cementation over a three-unit design. Furthermore, a single retainer is usually preferred as debonding will be quickly observed. Using a single cantilever eliminates the differential bond strength due to differing size and mobility of abutments^[1,4]. Hussey, et al.^[4] reported 94% success rate of 142 cantilevered RBFDPs. Kern^[5] conducted a prospective study of 37 resin bonded bridgeworks, and concluded that cantilever all-ceramic resin-bonded fixed partial dentures made from high-strength oxide

ceramics present a promising treatment alternative to two-retainer RBFDPs in the anterior region.

Conclusion

While survival rate for RBFDPs remains lower as compared to conventional fixed partial dentures, they have an important role to play in certain clinical situations responding to esthetic, biological and functional requirements. More attention should be given when selecting and preparing abutments to avoid or to reduce complications, such as debond, secondary caries, and endodontic problems.

Evolution of dental material led to the development of all-ceramic RBFDPs which provide good esthetics, with excellent biological outcome. Cantilevered resin bonded bridgeworks showed the greatest survival and success rate as opposed to conventional RBFDPs.

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