



RESTORING LONG SPAN EDENTULOUS ARCH WITH FIXED DENTAL PROSTHESIS A CONSERVATIVE APPROACH

Dental Science

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ABSTRACT

This report describes the case of a 48-year-old female patient who wanted to replace her missing teeth. Edentulous arch span was long so a 4 unit fixed movable resin bonded fixed partial denture [RBFDP] was planned. Ceka preci vertex extracoronal attachment was used to provide non rigid connection between minor and major retainer. RBFDPs are a conservative tooth replacement option that requires minimum tooth preparation and retention by a resin cement to etched enamel. This case report highlights the use of modified non-rigid connector which allows relative movement between abutment teeth and therefore a reduced stress on the bonding interface of resin bonded prosthesis. It is proposed that the use of modified non-rigid connectors that allow independent movement between the abutment teeth during function is responsible for the long term clinical success of fixed-movable RBFDPs.

KEYWORDS

Resin bonded fixed dental prosthesis [RBFDP], Non rigid connector, Fixed dental prosthesis [FDP]

Introduction:

Resin bonded fixed dental prosthesis has been popular since the technique was described by Rochette in 1973 for splinting mandibular anterior teeth with a perforated metal casting.¹⁹ His work suggested an alternative to metal ceramic fixed dental prosthesis, with minimal tooth structure removal, anatomically contoured and esthetic restorations. Resin bonded prosthesis gained popularity because of minimal removal of tooth structure particularly for abutment teeth that are intact and caries free. Modifications in resin bonded fixed partial framework design, retentive features in abutments and pre-treatment procedures of casting alloys like sand blasting, electro etching and tin plating can improve retention of the prosthesis.¹² However the present literature suggests that the greater the number of missing teeth greater will be the chances for debonding of prosthesis.^{4,19}

The failure of fixed RBFDP is because of complex interabutment stresses in function and parafunction movements and mandibular flexure in anterioposteriorly as well as medially during opening and closing of mandible.^{7,8} The success of 2 unite cantilevered RBFDP may be attributed to the independent nature of two-unit prostheses that are not subjected to adverse interabutment stresses.^{7,14} Such stresses have been shown to reduce the retention of fixed-fixed RBFDPs.²¹

The chances of debonding of long span fixed RBFDP are more as discussed above it is indicated to fabricate movable fixed RBFDP in long span edentulous arch cases. Also literature suggested to utilize non rigid connectors because the abutment had different pericemental area, different bone support, different tooth mobility and in some case different alignment of the abutments which increases the possibility of debonding.^{20,8} This paper presents a clinical case report of restoring long span edentulous arch with non rigid connector. The design principle of fixed movable long span RBFDP provides more resistance and retention along with free movement between abutment in vertical and in horizontal direction because of non rigid connector which reduces harmful interabutment stresses.

Outline of the case

A 48 year old woman complained of decreased ability for chewing and wanted to replace her missing maxillary right second premolar and first molar [fig1,2]. On clinical examination there was missing upper right second molar and first molar with class III caries with class V GIC restoration on upper right 1st premolar. She refused implant surgery and a fixed movable RBFDP was planned with incorporation of non rigid connection between upper right first premolar and upper right second premolar and composite filling for upper right canine.



FIG 1



FIG 2

preoperative view

Abutment teeth preparation generally follows the established principle for RBFDPs. The height of contour of the abutment teeth was lowered with regard to the path of insertion and a smooth knife-edge margin no closer than 1 mm above gum margin was prepared with a tungsten carbide 170 bur (Hi Di; Ash, Surrey). After tooth preparation, putty wash impression was taken with an additional silicone (Speedex, Coltene, Switzerland) and poured in type IV dental stone (Kalabhai, India). CEKA PRECI VERTIX prefabricated plastic pattern attachment was used to fabricate movable joint between major and minor retainers. [fig 3].

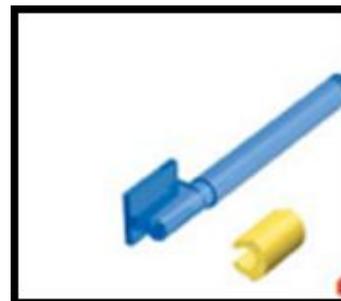


FIG 3 Ceka prefabricated plastic pattern

Now the cast was surveyed on the dental surveyor and patrix part of the CEKA attachment was attached to the wax pattern of minor retainer on upper right first premolar. Wax pattern along with patrix part was cast in Optimum nickel chrome alloy (Wirocer plus, Bego, Germany). [fig4] After finishing and polishing of minor retainer on first premolar with patrix part wax pattern fabrication was done for major retainer with two pontic and matrix part incorporated on mesial surface of second premolar pontic. [fig5]



FIG 4 minor retainer on 1st premolar with patrix part attached to it

FIG 5 wax pattern for major retainer with matrix part attached to it

Casting of wax pattern of major retainer along with patrix part was done and final trial of whole assembly was carried out [fig 6]. After metal trial ceramic (ceramco, Densply, India) was applied to pontic fabricate final prosthesis. Fig 7 shows intraoral view of final prosthesis.



FIG 6 metal trial of Prosthesis

FIG 7 occlusal view of final prosthesis

FIG 8 final prosthesis in occlusion

Discussion

Based on scientific evidence Pjetursson and Lang suggested that planning of prosthetic rehabilitations should preferentially include conventional tooth supported FDPs, solely implant-supported FDPs or implant-supported single crowns.¹⁸ However, the biological cost of full coverage FDPs on abutment teeth is significant as compare to partial veneer retainers² and in addition patients may refuse even free implant surgery because of Fear of pain, surgical and post surgical complications and social embarrassment, exacerbated by age. These are important factors for refusal of implants by elderly patients^{11,13}.

Furthermore, Resin-bonded FPDs for replacement of a single missing tooth has been used for many years now and their greatest advantage being the minimum preparation of the abutment tooth. The advantage of RBFDP are minimal removal of tooth structure and pulpal trauma. Supra gingival preparation makes easy impression procedure and decreases periodontal irritation also interim restorations are not required. This way it reduces chair side time and it is cost effective for patient. Barrack G, did a long term prospective study of the etched-cast restoration and showed that contemporary designs with mean service times of 6 years achieved a 93% success rate.¹

Creugers NH revealed that resin-bonded FPDs for posterior tooth replacement is less retentive than anterior tooth replacement, but further in 1997 he concluded that debonding rates decreases with modification in preparation design, luting agent selection, and area of placement within the dental arch.^{8,7} Riyadh Z. Emara advocated incorporation of grooves in tooth preparations to increase the retention/ resistance of molar resin-bonded retainers. Increased retention and resistance was statistically significant in maxillary molars compare to mandibular molars because of mandibular flexure during opening and closing of mouth leads to debonding of mandibular resin bonded fixed dental prosthesis^{10,14,17}.

Furthermore, while Pjetursson and Lang considered that resin-bonded fixed partial dentures (RBFDPs) "second option" based on a single study of 9.1 years follow up of 51 RBFDPs with a variety of prosthesis designs, many other clinical studies demonstrated that 2-unit cantilevered RBFDPs are a durable prostheses.^{3,5} Ideally RBFDPs should be bonded to enamel whenever possible to get strong bond however, dentine may be exposed during RBFDP tooth preparation and the use of a dentine bonding agent is appropriate. In case of long span edentulous arch intrabutment stress concentration is great which

leads to debonding of retainers. So, It would appear that incorporation of the non-rigid connector, allowing independent movement of the abutments leads to the success of the prosthesis in an edentulous span of up to 17 mm.¹⁶ Sanford plainfield observed that problems regarding debonding of resin bonded fixed partial denture lies with the mobility of the abutment teeth during function and not with the bonding procedure. A stress relieving modification to frame design has proved effective in preventing debonding of the prosthesis during function.²⁰

However for several stresses, several modifications of the stress-relieving principle were made in the design like three piece golden gate bridge²⁰, two-part resin bonded cast metal bridge¹³ and matrix and patrix part to resin bonded prosthesis.¹⁶ Long-span resin-bonded FPDs incorporating nonrigid connectors that allow independent movement between the major and minor retainer appear successful in the short term. Further research is required to determine their long-term efficacy.

Conclusion

This paper describes the successful replacement of long span edentulous space with fixed movable resin bonded fixed prosthesis with a fixed movable design which was retentive and functional as well. Modified non-rigid connector that allow movement between the abutments in long span edentulous ridges reduces adverse load and stresses at the restoration- cement-enamel interface providing greater retention and improved clinical prognosis.

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