

# Metallic Occlusal Overlay Prosthesis - Pivotal Therapy for reduced Interarch Space: A Case Report

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## Abstract

Reduced interarch distance, resulted from extrusion of antagonist teeth and/or down growth of alveolar bone due to long-time absence of natural teeth without adequate restoration in this area, is found in many cases. In such condition, it is difficult to fabricate a distal free-end removable partial denture with conventional resin base because of insufficient space for denture base resin, metal framework and artificial teeth, and the long-term prognosis of the denture is questionable due to minimized strength of the denture base. These designs provide strength, esthetic and masticatory function to the denture, and the denture base is convenient for future denture repair or relining.

**Keywords :** Reduced Interarch Distance, Overlay Prosthesis, Removable Partial Denture.

## Introduction

Posterior edentulous area may pose a plethora of restorative challenges. Further both biomechanical and restrictive interarch space leading to complication in fabrication of prosthesis. As occlusion is directly proportional to masticatory surface area and chewing efficiency it is very important to have prosthesis which aids in function, comfort and esthetics of the patient. These can either be achieved by surgery, intensive procedures or fabrication of prosthesis. When, interarch space is severely restricted, precluding the use of a conventional partial denture with acrylic resin denture teeth and an acrylic resin saddle<sup>1</sup>. In posterior edentulous areas with insufficient interarch space for a conventional partial denture, the advantages of metal occlusal

surfaces can be preserved by designing a removable partial denture with a metal denture base and metal pontics. When the removable partial denture is tooth supported and the residual ridge is well healed, the metal base can be used to an advantage, because the metal base is more hygienic and possesses greater strength and thermal conductivity than does acrylic resin<sup>2</sup>.

Recently, Bange et al<sup>3</sup> have reported a reasonable method for fabricating a removable denture by casting a gold alloy for the occlusal surface against a nickelchromium alloy framework<sup>4</sup>. Coleman and Evans<sup>5</sup> described a modified removable partial denture for treatment of a patient with a severely restricted interarch space. Their prosthesis employed metal base and metal pontics, cast in one-piece, from nickel-

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chromium alloy. Although this method made a simple and economic restoration for the patients specific edentulous condition, the safety, efficacy, and wear characteristics provided by the occlusal surfaces of nickel-chromium alloy have not been well assessed.

This article describes the treatment of a patient with bilateral posterior edentulous areas and insufficient interarch space for a conventional partial denture design, a modified removable partial denture with metal bases and metal pontics covered with facial veneers of composite resin was used to restore the patient's occlusion.

### Case report

60-year-old male patient reported to our department with a chief complain of inability to chew food. On intra oral examination patient had bilaterally missing maxillary posterior teeth (14, 15, 16, 17, 26, 27) along with missing maxillary lateral incisor and first premolar (22, 24). In mandibular region patient had missing first molar 36 with root canal treated (34, 35) premolars. Single tooth implant was placed at missing molar region and crowns were cemented on root canal treated premolars. Following that treatment for maxillary removable partial denture was initiated.

Maxillary anterior teeth were rotated along with maxillary canine. Posterior bilateral edentulous areas were present in maxilla. Different treatment options were available for patient and for meanwhile flexible denture was given first to patient as interim prosthesis and it acted as guide also for implant placement. CBCT was done for patient.

Implant supported prosthesis was planned but patient didn't agree because it was c-h and c-w type of bone and it required extensive direct sinus lift surgery bilaterally (Fig 1 & 2) patient

was diabetically compromised so patient refused this treatment (Table 1). Second option included fabrication of cast partial denture framework but with reduced interarch space and supraeruption of opposing teeth it became difficult. Further, it required extensive coverage of palate but patient refused complete palatal coverage. The last option was an overlay prosthesis which was advantageous over other as it requires less space and it is noninvasive moreover it doesn't cover the whole of palate so causing it more efficient for speech and mastication and improves socio- economic status of patient. Shorten dental arch and minimal coverage of the palate was the main idea to give patient desired esthetics ,function and comfort.

**Table 1: Treatment Options**

Different treatment options available	Reasons	Why not done
Implant supported maxillary prosthesis	Reduced c-h and c-w	Direct sinus lift was required
Cast partial denture framework	Reduced space	Inadequate space for clasp, biomedical consideration cannot be achieved
Flexible denture	Interim prosthesis	
Maxillary overlay prosthesis	Requires less space Non invasive	Good option

Interarch space was minimal (Fig. 3 & 4).The long edentulous span, rotated teeth, height of potential abutment teeth, and inadequate interocclusal distance precluded treatment with a fixed partial denture. Review of the patient's dental history and information provided by the patient revealed that previous attempts at increasing vertical Dimension of occlusion were made but were unsuccessful, resulting in headaches, tinnitus, and muscle soreness.

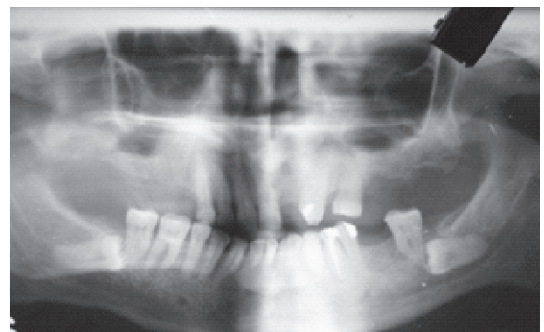


Fig 1: OPG of the patient insufficient space for implant placement

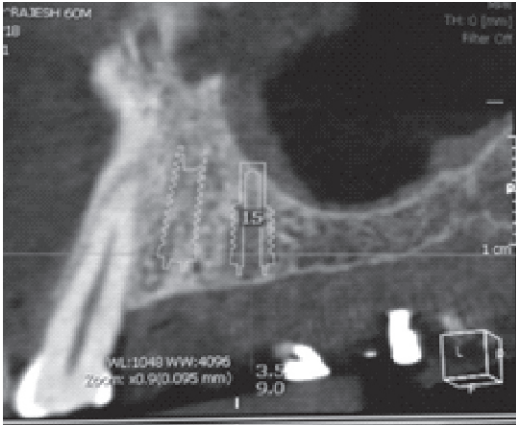


Fig 2: CBCT of the arch showing implant impinging on sinus



Fig 3: Left Lateral View Showing limited Interarch Distance



Fig 4: Right Lateral View Showing Limited interarch distance Surface for Porcelain Build up

### Prosthetic procedures

As patient had Kennedy class II mod II type of classification in maxillary arch, a diagnostic

impression and mounting was done to estimate the interarch space. Mouth preparation completed in maxillary arch with rest seat preparation on canine and premolar (13, 25). Direct retention was given on premolar (25) with cast circumferential clasp along with indirect retention on canine C clasp (23). Infrabulge Y Clasp (13) was given on canine which acts as direct retainer (Fig 5). Impression was made in poly vinyl siloxane impression material and poured in improved die stone. The adequacy of rest preparations, undercuts, and rest seats present on the patient's natural teeth was evaluated using information obtained from the clinical examination and the stone cast. Analysis with a surveyor demonstrated that existing tooth contours were adequate to be used with a modified removable partial denture design. A horse shoe shape major connector was designed to provide support, stabilization, and indirect retention. A series of stepbacks were incorporated into the horseshoe maxillary plate to prevent the unnecessary display of metal. The framework was designed for metal bases and metal pontics, and the occlusion was waxed on the mounted refractory cast to a cast of the opposing dentition with a semiadjustable articulator with a custom anterior guidance table. The facial surfaces of the pontics were cut back during framework waxing to receive veneers of tooth-colored composite resin.



Fig 5: Maxillary RPD Framework with Metallic Occlusal Surface and Serration on Buccal

The waxed framework was sprued, invested, and cast in cobalt-chromium alloy. After recovery, sprues were removed and the framework was sandblasted and electro polished. The framework was seated on the master cast, the occlusion was refined, and the framework was finished and polished (Fig. 6). The framework was tried in the mouth adjusted as necessary, and returned to the laboratory for processing of the facial veneers of tooth colored resin. The completed prosthesis with the processed resin veneers was delivered to the patient.

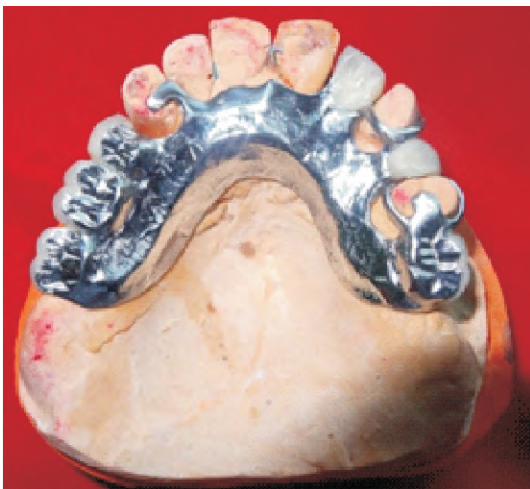


Fig 6: Maxillary Final Prosthesis

### Discussion

Occasionally, interarch space is severely restricted, precluding the use of a conventional partial denture with an acrylic resin saddle. A modified removable partial denture with metal bases and metal pontics covered with facial veneers of tooth-colored resin was used to restore the patient's occlusion. This method of treatment provided a simple and economical restoration for the patient's partially edentulous mandible. The patient's esthetic and functional requirements were satisfied.

### Conclusion

The results of this clinical case suggest that the prosthesis made from cobalt chromium alloy with metallic occlusal surface and metal pontic have been particularly effective and suitable for the patient with a reduced interarch distance. Post operative instructions were given to patient regarding not soaking the prosthesis in chlorinated water as it can cause tarnish to the prosthesis. The patient was very satisfied with the occlusion and esthetics provided by the prosthesis. The patient was evaluated after three months and found that patient had no problem in mastication, swallowing and speech.

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