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## RESEARCH ARTICLE

### A MULTI-DISCIPLINARY APPROACH TO FULL MOUTH REHABILITATION USING CAST PARTIAL DENTURE: A CASE REPORT

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#### ABSTRACT

A successful management of full mouth rehabilitation demands a multi-disciplinary approach for its long-term success. Treatment of a maxillary and mandibular distal free end edentulous arch along with upper and lower anterior teeth requires various contemporary and conventional prosthodontic treatment modalities. Management of distal extension situation provides complexity of biomechanical problems due to the three-dimensional movements of the distal extension denture. Cast partial dentures can be an excellent option when economic or anatomic conditions do not permit the use of dental implants. They give functionally and esthetically good results. This article describes full mouth rehabilitation of a partially edentulous patient with cast partial dentures and fixed partial denture.

## INTRODUCTION

An important criterion in restoring worn out dentition is to determine the amount of vertical dimension of occlusion that has been lost (Dawson, 2007; Jahangiri, 2002). As a result, side effects that occur are esthetic problems, decreased masticatory efficiency, and temporomandibular joint disorder due to loss of anterior and lateral guidance (Muts, 2014). Aesthetic and a functionally successful prosthetic rehabilitation demand's careful attention and thorough treatment planning. Rehabilitation of a partially edentulous arch can be challenging in case of distal extension cases such as Kennedy's class I and class II situations (Carr, 2011). In such a situation, a fixed partial denture cannot be planned because of missing distal abutment. Implant-supported prosthesis can be planned, but it is sometimes not possible due to an insufficient amount of bone quantity and quality and also because of economic reason. So, in such cases an acrylic removable partial denture or a cast partial denture is largely preferred (Bakers, 1981) Turner and Missirlian recommended to form a treatment plan considering the amount of loss of vertical Dimension of occlusion and interocclusal space necessary for prosthetic rehabilitation (Turner, 1984).

Most of the times it is necessary to restore the lost Vertical Dimension of occlusion in order to secure interocclusal space for prosthetic restoration and improve occlusion and esthetics (Turner, 1984; Ibbetson, 1989). This clinical case report describes a multi-disciplinary approach for restoration of lost vertical dimension and prosthetic rehabilitation of patient using a combined prosthesis: a fixed dental prosthesis designed to interfere with a removable cast framework partial denture.

## CASE REPORT

A 54-year-old female patient reported to the Department of Prosthodontics and Crown and Bridge, with a chief complaint of difficulty in mastication due to missing natural teeth and poor appearance due to worn-out and discoloured teeth (Figure 1). A detailed medical and dental history was recorded and it was confirmed that the patient was not under any medical supervision. After clinical examination and necessary radiological examination, a compressive treatment plan was formulated and the same was thoroughly explained to the patient along with duration of the treatment and anticipated outcome of the treatment. After a thorough oral prophylactic procedure, diagnostic impressions were made with irreversible hydrocolloid impression material and casts were obtained and diagnostic mounting was done on a semi adjustable articulator at an established vertical height.

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The upper and lower remaining teeth were endodontically treated. After assessing the clinical crown height to facilitate the crown retention, a crown lengthening procedure was carried out with 11,13,21,22,23 (Figure 2) followed by post space preparation for receiving prefabricated glass fibre post of desired length and core build up with light cure composite resin (Figure3). Biomechanical preparation of the teeth was carried out with all the teeth and check cast was obtained for surveying and planning of cast partial denture components. After required adjustments, gingival dilation was done and final impression was made with elastomeric impression material. Temporisation was done and interim removable partial denture was delivered to the patient. After evaluating the marginal adaptability in metal trail, metal ceramic crown restoration with incorporated rest were fabricated with appropriate shade and cemented (Figure 4).



Figure 1: Pre-operative view

The upper and lower posterior edentulous space was restored with a unilateral distal extension cast partial denture. Anterior-posterior palatal strap major connector was designed for the maxillary arch and lingual plate for mandibular arch. After assessing the fitting of metal framework, border moulding with low fusing impression compound was recorded and final impression was made with elastomeric impression material (Figure 5). Altered Cast technique was used for obtaining the final cast and jaw relation was recorded and transferred on semi-adjustable articulator (Figure 6). Teeth arrangement and try in of waxed up denture was done. Aesthetics, phonetics and vertical relation was assessed. After acrylization the final prosthesis was delivered to the patient (Figure 7).



Figure 2: Crown lengthening procedure

## DISCUSSION

This article will discuss a multidisciplinary team approach of full mouth reconstruction case involving crown lengthening procedure, post and core restorations, crowns, fixed partial dentures, cast partial dentures. By the end of this article, the reader will be well aware of the restorative outcome of the treatment both functionally and aesthetically. In 1984, Turner classified the treatment modality of a severely worn dentition by the amount of the loss of Vertical Dimension of Occlusion and amount of space available to restore it. His classification and conventional treatment options, which includes raising the Vertical Dimension of occlusion with multiple crown-lengthening procedures, have still been widely used. However, the etiology of tooth wear has multiple causes, and clinical controlled trials of restorative and prosthodontic approaches are limited in quantity and quality (Song, 2010). The removable cast partial denture option still remains an essential prosthetic consideration in many oral conditions. The distal extension cast partial denture presents a number of designs and maintenance challenges. Distal extension cast partial dentures are complex because of the teeth present and mucous support, requiring better stress distribution for both tissues to avoid vertical, horizontal and torsional forces that may have adverse effects. A functionally and physiologically comfortable prosthesis can be achieved by limiting the free movement of distal end of cast partial denture by supporting it with an dental implant, which has been well documented in the literature, but in this case as the bone quality was not feasible for implant therapy so other options were selected. For better load distributions in distal extension partial denture other measures like the use of functional reline impressions, various design considerations like RPI systems are recommended.



Figure 3: Post and core build up with composite



Figure 4: Porcelain fused to metal ceramic crowns with incorporation of rests



**Figure 5: Try-in of cast partial metal framework in both the arches**



**Figure 6: Jaw relation**



**Figure 7: Complete rehabilitation with cast partial denture insertion**

Cobalt–chromium (Co–Cr) alloy is the material of the choice to construct cast partial denture frameworks because of its cost effectiveness, resistance to corrosion, high micro hardness number, modulus of elasticity and low density. Several studies have reviewed stress distribution of distal extension cast partial dentures with different designs. Posterior occlusion in tissue supported distal extension is not that promising but it can be enhanced by various occlusal schemes (Nidawani, 2014). In this case, the patient was carefully monitored for the period of 1 month so that we can evaluate the adaptation of the raised removable partial denture and the patient's adaptation to the provisional restoration were also closely monitored for one month. The trial period is shorter compared to the other case report, but the discomfort, wear, and muscle fatigueness were not observed during that period. The increase in the Vertical Dimension of Occlusion was not determined by the standardized aesthetic golden proportion of anterior teeth but by the patient's physiological factor like interocclusal rest space and speech. If the increase in the vertical dimension of occlusion was decided by arbitrary method without the close evaluation, multiple complications would have been resulted and longer treatment period might be needed. So, depending on the patient's situation and adaptation ability, the interim restorative period can be altered, and the careful evaluation and monitoring may shorten the overall treatment duration. The rehabilitation of the worn-out dentition using restoration of anterior crowns and cast partial denture providing the posterior support is economical and common for many patients who require the treatment of worn teeth because of the economic reasons and tradition. Although, the restored anterior teeth can be easily exposed to excessive occlusal loads, if the patient fails to use the cast partial denture or resorption of residual ridge exceeds. As the compliance of patients in wearing the free-end saddle dentures has been seen to be poor, the education on wearing cast partial denture is necessary, regular check-up for the occlusal adjustment and cast partial denture fitting is essential (Song, 2010).

### Conclusion

This clinical report demonstrates raising of the vertical dimension of occlusion by using cast partial denture following fixed provisional based on the accurate diagnosis showed successful full mouth rehabilitation for severely worn out dentition. The goal of restoring partially edentulous patient with cast partial is restore masticatory function, establish stable posterior occlusion with established vertical dimension.

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