

Case Report

Tooth supported overdenture opposing a tooth supported bar overdenture for restoration of the complex prosthodontic clinical situation

Peter Mathew ¹, Jacob John H ²

¹Lecturer, Department of Restorative Dentistry, CIIDSRC, KUHS, Kerala.

²Assistant Professor, Department of Prosthodontics, CIIDSRC, KUHS, Kerala.

ABSTRACT:

Dental treatments very rarely are decided by a choice that may not be preferred by a certain dentist. Such instances usually occur when a patient enters in the OPD with a failed treatment done by someone else. An elderly male patient reported with chief complaint of failed prosthetic treatment in both maxillary and mandibular arches. Examinations revealed that the patient had a tooth supported overdenture in the maxillary arch and an anterior mandibular six unit tooth colored acrylic fixed partial denture. All teeth were not treated endodontically which explained patients discomfort due to sensitivity. Treatment plan allowed a conservative prosthesis design in the form of a tooth supported (single coping) overdenture for the maxillary arch and a complex designed tooth tissue supported bar overdenture retained by a clip for the mandibular arch. Major difficulties were anticipated in mandibular framework fitting and vertical dimensions, recording that were physiologically biocompatible. Clinical reasoning for such difficulties have been discussed.

Key words: complete denture, endodontic treatment, dowel core, precision attachment, vertical dimensions.

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Corresponding Author: Dr. Jacob John H, Assistant Professor, Department of Prosthodontics, CIIDSRC, KUHS, Kerala.

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INTRODUCTION

All prosthodontic situations are undesirable if one compares them to the advantages of having a natural tooth as an alternative. Among various preventive prosthodontic options mentioned in the literature, ¹ the use of overdenture is perhaps the most successful treatment option. Its versatility in nature is backed up with its distinct advantages (proprioception, tactile sensitivity), ^{2,3} which are all related to retaining the natural tooth within the bone and using the same to support the overlying denture. For a patient the most important advantage is that of stability, ⁴ which a patient may not realize if he has not worn a conventional denture before. ⁵ The concept of overdenture dates back to 1861, ⁶ and over the following decades and centuries, the concept hasn't changed much in the principles. ⁷ Even present day dental implants have included the option of overdenture supported by implants as a removable treatment option. Over the years the principle on which an overdenture is based have also been applied to some of its variants like immediate overdenture,

implant supported overdenture, tooth supported (with /without coping) overdentures. For treatment options like immediate overdentures, conditions for both options have to be met before planning such procedures. ⁸

Most patients in the underdeveloped and developing nations must understand that prosthodontic treatment needs skills that are learned during academic training while mastered through practice throughout one's career. In as much so, present day dentistry not only relies on one person's skill, but promotes a multidisciplinary skilled team, especially when it comes to rehabilitation using implant supported overdentures. ⁹ But as they say the world is not an ideal place, therefore one usually comes across certain patients in routine practice who are in dire need of a sound new treatment for their previous treatment has failed miserably. This article in the form of a case report presents such a rare case of a failed overdenture treatment in the maxillary arch and a failed fixed partial denture treatment in the mandibular arch.

CASE REPORT

An elderly male patient was referred from the undergraduate section of the department of prosthodontics with a chief complaint of previously failed denture treatment. The patient had visited a local dentist who had fabricated a denture on the maxillary and mandibular remaining teeth after grinding the surfaces of most teeth. Medical, social, drug and family history did not reveal any significant aberrations. Extra oral and intra oral examination of most of the parameters showed normal features except the occlusal surface of remaining maxillary and mandibular teeth having been prepared to receive a prosthesis (Fig 1A). While the maxillary teeth were haphazardly prepared without even having undergone endodontic treatment, the mandibular canines had been prepared to receive a metal ceramic restoration (Fig 1B). The clinical situation of the patient was extremely rare since he was not carrying any prosthesis. From the clinical picture, the maxillary arch seemed to have a tooth supported overdenture without any endodontic treatment, while the mandibular arch the remaining canines must have been restored with a self cure tooth colored six unit temporary fixed partial denture as per the description provided by the patient. The treatment options presented to the patient in the order of preference were a tooth supported overdenture for both arches with endodontic treatment, an immediate denture for mandibular and maxillary arch or an implant supported multiple prosthesis after restoring the remaining natural teeth individually using multiple post core crowns and a six unit mandibular fixed partial denture. After explaining and understanding the prognosis of each treatment, the patient consented for a tooth supported maxillary overdenture and a tooth supported bar overdenture for the mandibular arch. The treatment was commenced by recommending an oral hygiene maintenance program (3 months) followed by endodontic treatment of all remaining teeth. The prosthetic phase was initiated 3 months after completion of the last endodontic treatment. Maxillary intra radicular copings were fabricated for three remaining natural teeth using metal base metal alloy (Remanium CSe, Dentaaurum J.P. Winkelstroeter KG, Ispringen, Germany) (Fig 1C). The remaining tooth was used to support the overdenture utilizing an amalgam plug. All copings were cemented using zinc phosphate cement (Harvard, Germany). For the mandibular arch the existing prepared teeth were refined using a tooth preparation kit (Shofu, Japan) following which final impressions were made using addition elastomers (Reposil, Dentsply/Caulk; Milford, DE, USA). The individual dies for each prepared canine was fabricated (Fig 1D), following which wax patterns were made and then joined together by a prefabricated plastic bar attachment. Occlusal rims were prepared at this stage without including the metal framework of the bar overdenture. Vertical and

horizontal jaw relations were recorded which were then used to mount the respective casts on a semi adjustable articulator (Articulator #3140; Whip Mix Corp) using the compatible face bow (#8645 Quick Mount Face-Bow; Whip Mix Corp) (Fig 2A). Meanwhile, the casting of the bar attached on either side by a metal, acrylic crowns (Fig 2 B) was completed and trial done on the patient. This was followed by cementation of the bar in the mandibular arch using Zinc phosphate (Harvard, Germany), followed by another final impression. A framework for mandibular overdenture was fabricated using base metal non precious chrome cobalt alloy (Wiron 99; Bego, Bremen, Germany) (Fig 2 C).



Figure 1: (a) Intra oral view of Maxillary partial edentulous situation showing broken and attrited remaining teeth (b) mandibular residual ridge with previously prepared canines on either side (c) Intra radicular copings cemented on natural teeth in maxillary arch (d) Individual dies cut for fabrication of a bar connecting the two canines



Figure 2: (a) Preparation of occlusal rims for recording jaw relations (b) Bar framework with a plastic clip (c) Cast metal framework on the underlying bar (d) Completed maxillary and mandibular complete denture with a physiological vertical dimension.

The final prosthesis for maxillary arch were completed, although the framework for the mandibular arch had to repeat a number of times before adjusting the clip onto the bar framework. The patient was instructed regarding the maintenance of the prosthesis. The patient was extremely satisfied with the overall outcome of the prosthesis, especially the esthetic outcome (Fig 2 D).

DISCUSSION

This article presents a case of a failed maxillary overdenture opposing a failed fixed partial denture that was successfully managed by fabricating a tooth supported maxillary overdenture (with single coping) opposing a tooth supported bar mandibular overdenture. Various types of tooth supported overdentures can be either fabricated with or without endodontic treatment and with or without a coping.

The use of precision and/or semi precision attachment is decided upon the existing clinical condition that is based on multiple clinical factors.^{10,11} The use of implants as an alternative to natural tooth in serving as an abutment to overdenture in itself describes the importance of an abutment (tooth or implant) for overdentures. In the developing nations where implant treatment is not affordable, the use of two implant supported overdenture is fast becoming a minimum prosthodontic standard for eligible patients.¹² The feature of our case is the use of a bar overdenture that was supported by two mandibular canines. Bar being connected by individual copings on either canines that were cemented to the prepared teeth. Since there would have been a discrepancy in the shade if porcelain would have been used on two mandibular canines, we preferred to use heat cure tooth colored acrylic instead of ceramic. One of the chief advantage of having an implant as an abutment rather than a natural tooth as an abutment is that the implant abutment allows a wide range of attachment to be used while natural abutment tooth has limitations.¹³ In either case the use of attachments improves patients aesthetics and facilitates normal function by allowing proper vertical dimension of occlusion.¹⁴

Although, the mandibular bar overdenture may look innocuous yet good looking at design, the fitting of the clip within the denture over the bar can be cumbersome at times as we experienced in this case. The amount of metal used for the framework of the complete denture is critical.¹⁵ In our case we repeated the casting three times with different designs. Each time the new casting was done using less amount of metal in the final pattern. The chief problem was created by the casting shrinkage which always resulted in poor fitting of the plastic clip on the bar. Thickness of bar was also reduced towards the sides to minimize effect of shrinkage. Accommodating the bar overdenture within the prosthesis also requires a careful approach in estimating vertical dimension of occlusion in such cases. One needs to provide the

necessary space and contour for the bar. Negligence and careless estimation of vertical dimensions have been reported to be associated with severe bone loss.¹⁷ In our case however, since the denture is supported by teeth that are connected with a bar, there will be altered in biomechanics if vertical dimensions are not correct.

One of the chief biological advantages that overdentures possess is their masticatory efficiency. While the masticatory efficiency is dependent on multiple factors, including the type of teeth selected for the prosthesis,¹⁸ studies have shown improved masticatory performance with implant supported mandibular overdentures also.¹⁹ In either case, there is improvement in the coordination of masticatory muscles which allow the patient to impart more forces on the food.²⁰ as can be observed in this case, the foundation of both maxillary and mandibular dentures takes lots of effort, time and energy in fabrication without even thinking about the financial implications, therefore such prosthesis whenever fabricated should have durable occlusal surfaces like that of customized base metal alloy.²¹ only then the patients masticatory efficiency can be maintained for a long period of time. This is one of the drawbacks that the authors associate with this case report.

CONCLUSION

Shortcuts to dental treatment can land patients in an undesirable situation. Whenever dental treatment is required one should consult only a professional person. Tooth supported overdentures can be used for both arches in the same patient. Vertical dimensions and framework design are critical and sensitive procedures. Any form of tooth supporting denture is a source of extreme satisfaction for both the patient and the dentist.

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