

## PROSTHETIC REHABILITATION WITH MANDIBULAR OVERDENTURE AND MAXILLARY COMPLETE DENTURE IN A PATIENT WITH PARTIALLY EDENTULISM IN LOWER ARCH: A CASE REPORT

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### *Abstract*

Most of the cases of tooth loss are associated with trauma, caries, periodontal diseases, congenital defects, and iatrogenic treatment which later progress to complete edentulism. The effects of edentulism include loss of support, poor ridge foundation, low proprioception and patient dissatisfaction due to poor retention of denture. Decreased ridge foundation is severely seen in mandible which causes poor retention of mandibular complete denture. To overcome these drawbacks of poor retentivity, proprioception and decreased ridge foundation two or more teeth can be preserved in the mandibular arch to provide support for an overdenture. An Over denture is a removable partial denture or complete denture that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and or dental implants.

### *Keywords:*

*Overdenture, tooth supported, metal copings, bar attachment.*

## INTRODUCTION

In spite of rapid development in the field of implant dentistry, preservation of natural teeth that are present is more important as De Van stated that "Perpetual preservation of what remains is more important than the meticulous replacement of what is missing".<sup>1</sup>

Tooth supported over dentures are a perfect example for this. An overlay denture is a complete or partial removable denture fabricated over retained teeth or roots that are not prepared with a coping to interface with the denture (Brewer and Fenton 1973).<sup>2</sup>

This is in contrast with an over denture in which the remaining teeth require endodontic treatment and cast gold copings (Lord and Teel 1969). Over denture using some metal coverage over tooth is beneficial option as it protects the underlying tooth, provides additional retention, increases the efficiency of tooth supported over-denture and gives the patient a sense of excellent satisfaction by increasing retention. The main problem associated with over denture is periodontal and endodontic failure of retained abutment tooth because of improper coverage of tooth with coping resulting in an open margin that increases chances of caries and poor oral hygiene maintenance leading to periodontal problems.<sup>3</sup>

This clinical report presents the fabrication of an upper conventional complete denture opposing a tooth supported bar retained mandibular overdenture.

The biologic maintenance of neuromuscular mechanism, the temporomandibular articulation and the supporting structures of a denture can be accomplished by teeth than the mucoperiosteum. Alveolar bone is preserved and the occlusal vertical dimension and centric relation are maintained. The patient benefits psychologically, functionally as well as biologic advantages.<sup>4</sup>

In past, extractions of remaining teeth with complete denture replacement were promoted as an inexpensive and permanent solution for oral health care; but in the present scenario, dentists try to preserve some teeth (even grade I mobile teeth) to stabilize, retain and support the removable dentures. The dental profession has correctly embraced preventive prosthodontics and put forth a solution of - "The overdenture".<sup>5</sup>

## CASE REPORT

A 54 year old female patient had reported to the Department of Prosthodontics with the chief complaint of inability to chew food properly due to multiple missing teeth. There was no relevant medical history affecting Prosthodontic treatment. Extraoral examination showed no abnormality. Intraoral examination revealed completely edentulous maxillary arch with partially edentulous mandibular arch with remaining teeth 34 and 43 respectively. Diagnostic impression and tentative jaw relation was recorded to check the inter arch space. After observing the space, and examination of the diagnostic cast and OPG the overall prognosis for the remaining teeth were good. The possible treatment plans were discussed with the patient -

- a. Extraction of remaining teeth in the mandibular arch followed by conventional complete denture in both maxillary and mandibular arch.
- b. Tooth supported over denture in the mandibular arch followed by implant supported over denture in the maxillary arch.
- c. Implant retained fixed partial denture in both maxillary and mandibular arch.
- d. Extraction followed by implant supported overdenture in the mandibular and maxillary arch.
- e. Tooth supported overdenture in the mandibular arch followed by conventional complete denture in the maxillary arch.

The condition of the remaining dentition in the mandibular arch were good and as the remaining teeth 34 and 43 were rotated; considering the financial condition of the patient it was decided to preserve 34 and 43 teeth by doing intentional R.C.T and to give tooth supported over denture using coping and bar attachments in the mandibular arch taking 34 and 43 as the abutment for over denture support and maxillary conventional complete denture.(fig 1) So, intentional root canal treatment was performed on 34 and 43

Primary impression for maxillary arch was made with impression compound and mandibular arch was made with irreversible hydrocolloid impression material. Sufficient tooth structure was removed to improve clinical crown: root ratio. Height of the crowns was reduced to 3mm from the gingival margin. Preparations were tapered towards the incisal surface terminating in a round occlusal surface as advocated by Miller. Tooth preparations were done with 34 and 43 and impression was made by single tray dual impression technique with putty( Aquasil Ultra LV Dentsply Caulk, Milford, USA) followed by light bodied impression material and temporary crowns were cemented.

Border moulding was done with green stick compound (DPI PINNACLE TRACING STICKS) and secondary impression was made with Zinc oxide impression paste (DPI IMPRESSION PASTE) for the maxillary arch. Master cast was poured and occlusal rim was fabricated.

Wax pattern for the prepared teeth 34 and 43 were fabricated and a coping with bar attachment was casted in the centrifugal casting machine. Coping with bar attachment were tried in patients mouth finally it was cemented with permanent cement. (Figure 2)

After cementation of the coping with bar attachment an impression of the mandibular arch was made with irreversible hydrocolloid impression material, primary cast was poured followed by fabrication of the custom tray. Conventional border moulding was done with green stick compound (DPI PINNACLE TRACING STICKS) and secondary impression was made with heavy body impression material (Densply Aquasil Ultra Heavy). Gap between the bar and the gingival surface was blocked with carding wax prior to make the impression.

Master cast was poured and denture base with occlusal rim were fabricated.

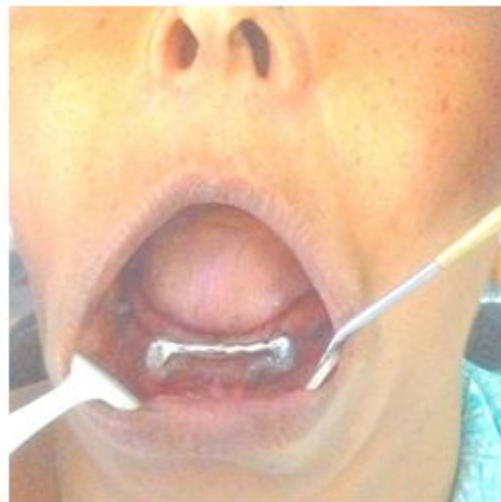
Jaw relation between the maxillary and mandibular arch was recorded and the rims were articulated in the articulator.

Using face bow record, upper cast was mounted and after recording vertical and centric relation, lower cast was mounted in semi adjustable Hanau wide veu articulator. (Figure 3a and 3b)

Teeth arrangement was done and the waxed up trial dentures were placed in the patient's mouth and try- in was done finally followed by curing, finishing, and polishing. The overlay denture was completed with the proper vertical dimension and improved profile. Most noticeably, the patient's attitude and disposition had changed. (Figure 4) Extra oral facial profile was taken (Figure 5 and Figure 6)



*Figure - 1*



*Figure - 2 Showing Coping with Bar Attachment*



*Figure - 3 (A) Facebow Transfer*



*Figure - 3 (B) Articulation of the Jaw Related Model*



*Figure- 4 Maxillary Complete Denture with Mandibular Overdenture Placed in the Patients Mouth*



*Figure- 5*



*Figure-6*

*Extraoral view of the patient*

## DISCUSSION

In this case a 54 year old female lady reported to the department of prosthodontics, Bangalore institute of dental sciences and hospital with a chief complaint of inability to chew food due to multiple missing teeth.

Elective endodontics was carried out with teeth 34 and 43. Abutment teeth were prepared with a dome-shaped contour hemispherically rounded in all dimensions. The height of the abutment teeth was 3-4 mm with the finish line placed supra-gingivally.

In this case report tooth supported over denture was planned instead of complete denture or implant supported overdenture as already mentioned earlier, it is always better to preserve teeth whenever possible.<sup>1</sup>

Tallgren concluded that anterior mandible height resorbed four times faster than maxillary ridge with conventional dentures. It was concluded in a 5 years study that retention of mandibular canines for Overdentures led to preservation of alveolar bone.<sup>9</sup>

Preservation of teeth allows reduction in bone loss and maintains proprioception that gives patient a sense of chewing and improves the acceptability of prosthesis, which ultimately helps the patient to maintain hygiene of oral tissues that in return increases the life of prosthesis and maintains physiological dimension of the patient.<sup>1</sup>

In addition, metal coping was used within the abutment teeth instead of using a bare abutment teeth. A header bar was attached between the two metal coping to provide additional retention and improve the acceptability of the prosthesis. The attachment in the over denture hinder the destructive horizontal displacements of the denture and permits a partial load transmission on the abutment system. The copings designed for the attachment Overdentures provide retention, resistance to rotation, and bulk when joined with attachment, without negating the advantage of reduced crown root ratio.<sup>1</sup>

Crum and Rooney assessed bone loss that occurred in patients wearing mandibular over dentures on two teeth compared with patient wearing complete denture. The duration of study was 5 years and results for the anterior mandibular were a resorption of 5.2 mm in patients wearing complete denture and 0.6 mm in patients wearing over denture.<sup>5</sup>

As such, wearing a mandibular over denture would appear to slow down the resorption process.<sup>5</sup>

In case of over denture prosthesis proprioception is maintained, there is presence of dimensional sensitivity, dimensional discrimination, canine response and tactile sensitivity. The average threshold of sensitivity to a load was found to be 10 times as great in denture wearers as in dentulous patient.<sup>6</sup>

A bar type attachment has advantage of greater long term retention and supports over traditionally used coping over dentures. Bar attachment provides a splinting mechanism between the abutment teeth and increase the stability and retention of the prosthesis and in turn stabilize and strengthen the abutment teeth allowing the forces of mastication to be shared by the abutment teeth.<sup>6</sup>

Overdenture with attachment can redirect occlusal forces away from weak supporting abutments and onto a soft tissue or redirect occlusal forces towards stronger abutments thereby resulting in superior retention.<sup>6</sup>

Patient respond favorably to Overdentures as it prevents atrophy both in maxilla and the mandible as a result of tooth loss. Apart from preventing bone resorption, overdenture abutments maintain sensory feedback and improve load transmission of the prostheses.<sup>8</sup>

The overall rate of tooth loss varied from low of 1.5% to a high of 14.3%. Toolson and Smith conducted a 5 years study of 133 overdenture abutments in 54 patients ; 16 of these abutments were extracted. Of these 5 were extracted because of periodontal disease, 10 because of caries and 1 because of endodontic failure. The authors concluded that periodontal problems were not a major cause of tooth loss. However, Reitz et al , studied 35 patients with 95 overdenture abutments; 13 of these teeth were extracted , 12 of which because of periodontal disease.<sup>10</sup>

The preservation of supporting teeth for overdenture abutments provides an efficient prosthetic treatment. However, tooth preservation requires proper diagnosis and planning to ensure acceptable long term performance, with the remaining roots used to maintain sufficient bone height and periodontal support.<sup>12</sup>

After tooth extraction the alveolar process is reduced due to bone loss, with great individual variation, which is impossible to predict at the time of extraction. For many patients this can lead to severe problems for the retention of conventional dentures.<sup>13</sup>

Overdenture requires particularly careful assessment of vertical space, especially with the attachments, i.e. there must be sufficient room for roots, copings and possible attachments, together with an adequate thickness of denture base material and artificial teeth, without jeopardizing the strength of the denture.<sup>14</sup>

Despite recent developments in dental implantology, the conservative approach to root preservation wherever possible is still valid. In view of increased root caries rate in the elderly and with several oral hygiene habits of most overdenture wearers, placing protective copings on root abutments, when economically feasible, is the preferred method of treatment.<sup>15</sup>

## CONCLUSION

Overdenture stabilization is an effective and efficient way of restoring partially edentulous patient with long term success in situation with increased amount of ridge resorption especially in the mandibular arch in geriatric patient. It provides better stability and chewing function. Yet routine maintenance of over denture along with the maintenance of attachment is very important for successful treatment outcome.

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