

Two Implant Supported Overdenture

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ABSTRACT

The most important aim of oral implantology is to improve the retention of complete mandibular dentures, which are often associated with problems in jaws with advanced ridge resorption and in the process improve patient's satisfaction. In this article, the fabrication process for 2-implant overdenture is described and illustrated. The retentive elements for the implant abutment were housed directly into the fitting surface of the denture with the help of autopolymerizing resin through a simple chair side technique. It represents a case of a typical edentulous patient looking for low-cost improvement of denture retention.

Keywords: Overdenture, Implant, O-ring attachment.

INTRODUCTION

The classical treatment plan for the edentulous patient is the complete removable maxillary and mandibular denture prosthesis. This treatment is relatively inexpensive in comparison with fixed implant-supported prostheses, but it has several drawbacks. Like all dental restorative procedures, a complete removable denture requires extensive attention to detail, if an excellent clinical result is to be achieved. Depending on the shape of the residual ridge, the denture may be unstable or inadequately retained leaving the patient dissatisfied with the functional result. The most important aim of oral implantology is to improve the retention of complete mandibular dentures, which are often associated with problems in jaws with advanced ridge resorption and in the process improve patient's satisfaction.^{1-3,5,6,9} During the past 20 years, placement of a bar-retained 4-implant overdenture in the front region of the mandible has become the treatment of choice in overdenture prosthodontics. van Steenberghe et al⁴ were among the pioneers to propose the placement of only 2 implants in the edentulous mandible. Their 98% success rate, with up to 52 months of observation was remarkable. Mericske-Stern et al⁸ reported 97% implant survival with 2 implants (splinted or solitary), irrespective of keratinized tissue or duration of edentulism. Naert et al^{12,14} compared the clinical outcome of different overdenture anchorage systems and found 100% implant

success after 5 years for all groups. Nevertheless, the controversy regarding the treatment concept and indications persists.

In this article, the fabrication process for 2-implant overdenture is described and illustrated. The patient did not undergo surgical procedures for improving the implantation bed before the implant placement, but instead represents a case of a typical edentulous patient looking for low-cost improvement of denture retention.

CASE REPORT

A 65-year-old patient reported to the clinic with chief complaint of loose lower complete denture prosthesis. The patient had been wearing denture for past 15 years and had the complaint of loose mandibular complete dentures since five years. On intraoral examination, the mandibular ridge was found to be resorbed. However, the ridge was U shaped, smooth with no irregularities. A thorough medical and dental history of the patient was recorded. Maxillary and mandibular study models (Fig. 1) were made and an OPG (Fig. 2) and Denta Scan was taken to assess the bone for selection of implants.

CLINICAL PROCEDURE

1. Since the old denture of the patient was not appropriate for the implant supported prosthesis, a new complete

maxillary and mandibular denture prosthesis was fabricated for the patient in accordance with the physiological and functional aspects for complete denture prosthesis.

2. With the help of lower complete denture prosthesis surgical stent was fabricated. Denta scan was used to identify the sites for the implant placement and the sites were marked on the surgical stent.
3. The implants (XIVE, Dentsply Lot No. M060010301 & M060010303) of size 3.8 mm × 9.5 mm were placed in the two sites identified (Fig. 3).
4. The patient was asked not to wear the lower denture for two weeks. The patient was recalled and the lower prosthesis was relieved from the area where the implants were placed and later lined by a soft reliner (Coe-Soft Reliner, Dentsply).
5. Periodic clinical and radiological investigations were carried out and once the evidence of osseointegration was established, the loading of the implants was initiated with the prosthetic rehabilitation.
6. After three months of implant placement, the cover screw of the implants were exposed and gingival formers were put in place to help in the establishment of per mucosal seal (Fig. 4).
7. After two weeks, the gingival formers were replaced by the ball bearing attachments (Figs 5 and 6).
8. The liner placed on the tissue surface of the prosthesis was removed.
A wax spacer was placed in that area and the prosthesis was put in place. The site of ball attachment was marked on the tissue surface of the prosthesis.
9. The sites for the retentive housings of the ball attachments were identified and the wax spacer was removed.
10. The retentive elements for the implant abutment were housed directly into the fitting surface of the denture (Fig. 7) with the help of autopolymerizing resin (Dentsply Repair Material). The final prosthesis was an excellent blend of retention, stability, and support. The patient was very satisfied (Fig. 8).

DISCUSSION

This procedure allows for the fabrication of implant supported overdenture prosthesis at a comparatively low cost without compromising esthetic and function. Also with

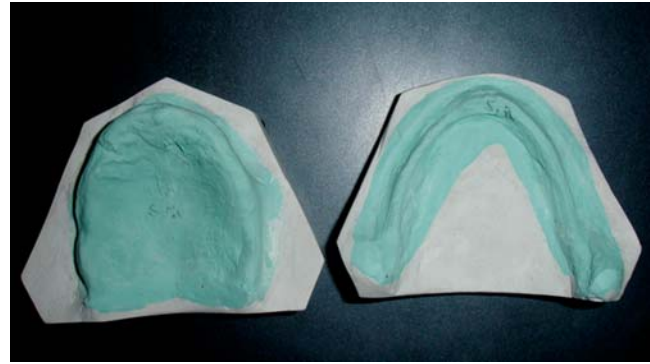


Fig. 1. Diagnostic models



Fig. 2. Orthopantomograph showing edentulous arches

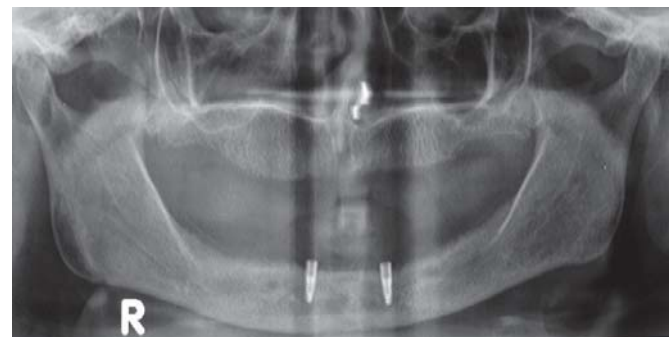


Fig. 3. OPG showing osseointegrated implants placed in the selected sites



Fig. 4. showing healed gingival tissue after the removal of gingival formers



Fig. 5. Showing implants with ball attachments



Fig. 8. Patient with the dentures

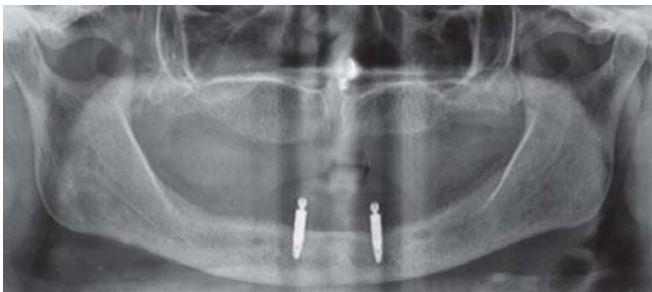


Fig. 6. OPG showing ball attachments and crestal bone 6 months after loading of the implants



Fig. 7. Showing the tissue surface of the mandibular denture with the retentive housings

this procedure, the prosthesis can be fabricated with materials that are readily available and familiar.

LoCascio and Salinas¹¹ for a conventional implant supported mandibular complete denture recommended

15 mm of space measured from the crest of the mandibular ridge to the opposing dentition at a correct vertical dimension of occlusion, whereas William et al¹⁵ recommended 17 mm space for an overdenture supported by framework, this is an additional 2 mm (for the fixed frame). The implant supported overdenture prosthesis also helps in preservation of alveolar bone. Crum and Rooney¹ have found that the reduction in the height of anterior part of the mandible in those patients wearing complete upper and lower dentures amounted to 5.2 mm as compared with 0.6 mm for the overdenture patients. The anterior mandible bone under an implant over denture may resorb as little as 0.5 mm over a 5 years period, and long-term resorption may remain at 0.1 mm annually.^{7,10,12} Same is true for fixed implant complete denture.¹

A photo elastic analysis done by Kenney and Richards¹³ indicated that the ball/O-ring attachment transferred less stress to the implants. It appears that the O-ring performed as it was intended allowing the overdenture to rotate around the ball connected to the implant body. As rotation occurred, stress was transferred perpendicularly to the posterior edentulous area providing optimal broad stress distribution to the ridge and minimal stress to the implants.

Sadowsky¹⁶ also concluded that the mandibular overdenture, retained by implants in the interforaminal region, appears to maintain bone in anterior mandible and appeared to improve retention, stability and chewing ability.

When two implants are used in the anterior mandible to retain an overdenture, solitary ball attachments appear to be less costly, less technique sensitive and more accommo-

dating for tapered arches. However, ball attachments seem to be less retentive than the bar design.

CONCLUSION

The use of implant-supported fixed prostheses to replace missing teeth in partially or completely edentulous jaws is a highly successful prosthodontic treatment modality. It contributes not only in improving the lifestyle of complete denture patients, but also helps in preserving and maintaining the alveolar bone.

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