

REHABILITATION OF ATROPHIC MANDIBULAR RIDGE WITH IMPLANT SUPPORTED OVERDENTURE – A CASE REPORT

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ABSTRACT

The introduction of osseointegrated implants and implant-retained prostheses has led to a paradigm shift for the management of edentulism. This is true especially for edentulous mandibular ridges where the problem of advanced alveolar resorption and difficulty in providing retentive, stable and functionally comfortable prostheses represent a major challenge. The present case report discusses the successful rehabilitation of resorbed edentulous mandibular ridge with an overdenture supported and retained by two implants opposing the conventional maxillary complete denture which resulted in a significantly improved denture retention and masticatory efficiency compared to the conventional complete denture prosthesis.

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INTRODUCTION

Conventional complete denture wearers experience a number of problems on a daily basis. Implant supported overdenture is rapidly becoming a successful treatment modality to overcome the problems that arise by wearing conventional complete dentures.^{1,2} Implant supported overdenture offer many advantages such as preservation of bone volume, proprioception, reduced prosthesis movement, better esthetics, better occlusion, increased occlusal function and maintainence of the occlusal vertical dimension.^{2,3} As the overdenture remains in place during mandibular movements, it allows the tongue and musculature in the perioral area to resume a normal function since they are not required to control mandibular denture movements.⁴

In this case report, overdenture supported and retained by two implants placed in the interforaminal region with ball abutments opposing the conventional maxillary complete denture has been discussed. Two ball retained attachments were used in the mandibular arch that fits passively with another attachment (female) on the intaglio surface of the denture contributing to the maximum prosthetic stability for the patients.

Case Report

A 63 year old male patient reported to the department of Prosthodontics with the chief complaint of difficulty in eating and speaking for the past 5 years due to missing teeth (Figure

1). Patient gave history of dental caries in lower back teeth and mobile upper front teeth, so he underwent extraction of the same. The extraction sequence was irregular where posterior teeth were extracted first followed by anterior and lower teeth first followed by upper teeth leading to complete edentulism (Figure 2,3). He had remained edentulous from last five years and had undergone rehabilitation procedure twice with conventional complete denture. As he was not satisfied with the denture, he discontinued its use. The patient was examined according to protocol and it was found that his maxillary ridge was favourable for complete denture construction.



Fig 1 Pre-operative front view

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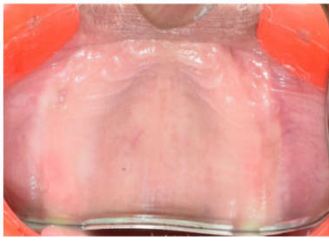


Fig 2 Completely edentulous Maxillary arch



Fig 3 Completely edentulous Mandibular arch

Preoperative orthopantomograph (OPG) was done to evaluate the status of bone in mandible (Figure 4). Thus, the patient was explained about the implant based treatment strategies.

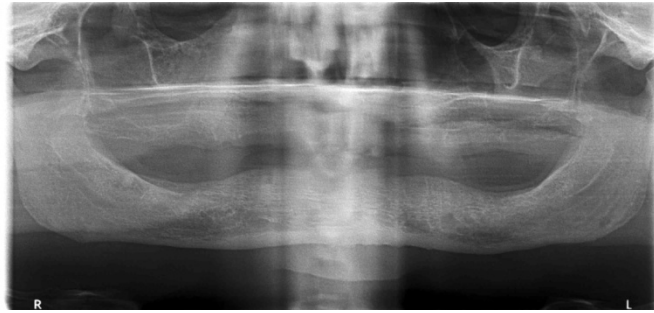


Fig 4 Pre-operative OPG Bone height- 20 mm Interforaminal Distance- 57mm

He was explained about the removable and fixed implant supported prosthesis. After discussing treatment options with the patient, implant supported overdenture with ball attachment and metal housing for retention and stability for the mandible and conventional complete denture for the maxillary arch was planned. Complete haemogram (Hb, BT, CT), random blood sugar test were done to evaluate patient fitness for implant placement.

Surgical Phase

Under antibiotic prophylaxis and standard aseptic protocol, preparation of the patient was done by anaesthetizing with inferior alveolar nerve block using local anaesthesia. After the region was anaesthetized, full thickness crestal incision was made (Figure 5) with extending from first premolar on right side to first premolar on left side. The mucoperiosteal flap was elevated and bone was exposed (Figure 6).

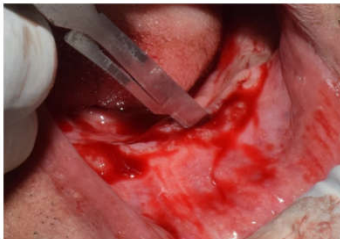


Fig 5 Mid-Crestal incision



Fig. 6 Full thickness mucoperiosteal Flap reflection

A pilot drill was introduced into the bone and two osteotomy sites were created without causing any damage to the adjacent anatomical structures (Figure 7). Two endo-osseous implants at B and D positions were placed (Genesis implants, 3.75 mm in diameter and 11.5mm in length) because of flexibility to add additional implant in site A and E, safe location from mental foramen and adequate inter implant distance. After the implant seating tip reached the adequate depth, healing abutments were placed. Later flaps were approximated; suturing was done using 3-0 vicryl suture material (Figure 8). Patient was prescribed with antibiotics and anti-inflammatory coverage.

He was recalled on the 7th day of surgery and suture removal was done.



Fig 7 Osteotomy site preparation



Fig 8 Placement of healing abutment with sutures

Prosthetic phase

After 3 months of healing, osseointegration was evaluated clinically and radiographically and then selected ball abutment was placed onto each implant (Figure 9).



Fig 9 Ball attachment placement

The denture was fabricated using the conventional protocol. For inserting the female attachment into the denture, indirect technique was utilized. A transferable mark with an indelible pencil was made on top of each ball abutment and the denture was seated to ideally determine the location for attachment housings. It was followed by preparation of recesses in the intaglio surface of the denture to accommodate the housings. Nylon processing insert were placed into each of the housings using the insert seating tool. Seating of the attachment housing onto each ball type abutment was done. Undercuts were blocked out under the housing and soft tissue to prevent acrylic resin from locking the denture onto the abutment. Self curing acrylic was applied into recessed area and around titanium housings for bonding of the housings to denture. Denture was inserted and the patient was guided to close the mouth into proper occlusion with the opposing arch. After the curing of acrylic, denture was removed. Excess acrylic around the housings and lingual vent hole was removed and polished. Processing insert was replaced with nylon retention insert into the housings. It was ensured that the insert seated securely in place and is in level with the housings rim. Overdenture was seated over the ball abutments. Proper instructions were given to the patient on insertion and removal of prosthesis (Figure 10,11).



Fig 10 Mandibular denture intaglio surface with metal housing and Maxillary denture



Fig 11 Post operative view while smiling

Patient was advised to maintain the oral hygiene properly and instructed regarding oral hygiene and denture cleansing procedures Patient was put on regular follow-up of 3 months, 6 months and yearly.

DISCUSSION

In this case report, overdenture was planned as by placing two implants in the mandible, resorption of bone can be reduced with simultaneous improve in patients functional movements and comfort. The use of two implants has shown to be biomechanically sound which provided better prosthetic stability and prevented rotational forces of the components. Also, numerous long term studies have confirmed that implant supported overdentures provide satisfactory result with only two mandibular implants.^{5,6,7} Overdenture with the help of two freestanding implants with ball abutment was chosen as it allowed the use of prefabricated stock retentive abutments. Two implants connected with bar design were not chosen as it would have required additional laboratory and clinical procedure for fabrication and also would have increased the cost of treatment.⁸ Also, ball abutments can be easily replaced in case of abutment failure without remaking the overdenture.⁸ For implant placement, mandibular anterior region was selected as it has sufficient bone in height and width in the interforaminal region. The survival rate of implants in this region is excellent and rate of surgical complication is very low.¹ Also, the compact bone in the symphysis region between the mental foramina seems to be sufficient to ensure excellent results over long periods.⁹

Direct method or intraoral pick up method was used for incorporation of the matrices into the overdenture as the indirect method is a technique sensitive procedure and, if not performed correctly can have a negative influence on the fit of the overdenture and can also lead to dislodgement of the matrix from the overdenture.⁸ On subsequent visits, patient was found to be satisfied with no complaints in terms of the chewing ability and retention of the prosthesis.

CONCLUSION

This case presentation discusses an implant-retained overdenture which is a simple and cost effective solution for the rehabilitation of the edentulous mandible. As the posterior ridge was resorbed, it was thought that it would not offer any support to the denture. Therefore, support was obtained from two free standing implants. Due to financial constraints the patient was not ready for the fixed type of restoration immediately. The same implants can be used for the fixed restoration in future after adding the implants in required site.

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