

## Implant supported overdenture for an atrophic mandibular ridge – a case report

Devaki V<sup>1</sup>, Deepashree R<sup>2,\*</sup>, Sajida Begum S<sup>3</sup>, Abila Muthurangam R<sup>4</sup>, Priyanka M<sup>5</sup>

<sup>1</sup>Professor, <sup>2,4,5</sup>CRRI, <sup>3</sup>PG Student, Dept. of Prosthodontics, Vivekanandha Dental College for Women, Affiliated to Tamil Nadu Dr. MGR University, Tamil Nadu

**\*Corresponding Author:**

Email: deepashree161094@gmail.com

### Abstract

The most frequently encountered clinical situation in a dental practice is the completely edentulous mandibular arch for which implant supported overdentures has been the predictable procedure over time. The greater flexibility of implant position and the enhancement of retention, support, stability of the overdenture makes it an ideal treatment modality to begin a learning curve in implant dentistry. The following case deals with the successful rehabilitation of resorbed edentulous mandibular ridge using a overdenture supported and retained by two implants placed in the interforaminal region with ball abutments opposing the conventional maxillary complete denture which resulted in a significantly improved denture retention and masticatory efficiency compared to the conventional complete denture prosthesis. Thus, implant supported overdenture turns out to be much simpler, affordable and minimally invasive procedure to treat majority of the patients.

**Keywords:** Implant, Overdentures, Edentulous, Ball abutments, Retention.

### Introduction

Implant supported overdentures has become a boon for the patients facing complete edentulism as it alleviates the challenges posed by removable complete denture prosthesis such as poor stability and compromised mastication. Its customizable and excellent esthetics makes it a captivating treatment modality for many potential patients.

An implant supported overdenture is a type of overdenture that is supported by and attached to implants differing from the regular denture that rests solely on the gingiva. Implant supported overdentures has special attachments that snap onto attachments present on the implants. McGill consensus statement (2002) has recommended the usage of two implants to support a mandibular denture as a basic standard of care thereby improving the quality of life related to oral health.<sup>(1)</sup>

In this case report, two ball retained attachments are used in mandibular arch in which each implant holds onto the metal attachment (male) that fits passively with another attachment (female) on the intaglio surface of the denture contributing to the maximum prosthetic stability for the patients.<sup>(2-3)</sup>

Thus a team approach was undertaken to meet up the expectations of the patients by conceptually visualizing the patient first, later in wax, and finally in acrylic dentures, the entire prosthodontic team was able to provide a highly functional and esthetically promising implant retained overdenture.<sup>(4)</sup>

### Case Report

A 63 year old male patient came to our prosthodontics department with the chief complaint of loose fitting lower denture with difficulty in mastication and speech. On examination, patient had resorbed alveolar ridge which lead to inadequate retention of the

lower denture prosthesis and patient is known to be a previous denture wearer for past 1 year. The Orthopantomograph findings showed the presence of sufficient bone height and width (Fig. 1), with dense cortical bone surrounded by dense trabecular bone. Thus implant supported overdenture was planned with two implants along with independent ball type attachments.



**Fig. 1: Pre-operative orthopantomograph taken reveals resorbed edentulous arches**

Blood investigations and informed consent was taken after discussing the treatment procedure with the patient and the bystander. Irreversible hydrocolloid impression was made and pre-surgical diagnostic casts were prepared. Inter-occlusal distance was measured in the diagnostic casts. The implant location was marked at B and D positions independent of each other.

**Surgical Phase:** Under antibiotic prophylaxis and standard aseptic protocol, preparation of the patient was done by anaesthetizing the mandibular anterior segment with inferior alveolar nerve block using local anaesthesia of 2% lignocaine with 1:80,000 adrenaline. After the region was anaesthetized, full thickness

crestal incision was made with surgical blade number 15 extending from first premolar on right side to first premolar on left side. The mucoperiosteal flap was elevated and bone was exposed. A pilot drill was introduced into the bone and two osteotomy sites were created using piezosurgery device without causing any damage to the adjacent anatomical structures.

Two surgical implants (3.3 x 13 mm) were inserted (Fig. 2) using motor driver at 35 rpm and the landmark of reach was checked with profile gauge. After the implant seating tip has reached the adequate depth, cover screws are placed. Later flaps are approximated, suturing done using 3-0 vicryl suture material. Patient was prescribed with antibiotics and anti-inflammatory coverage. Patient was recalled on the 8<sup>th</sup> day of surgery, suture removal was done.

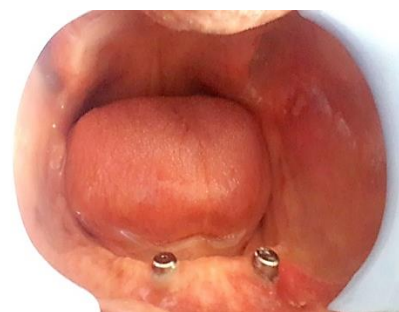


**Fig. 2: Two osteotomy sites were created and implants were placed**

Post operatively after 3 months, osseointegration was evaluated clinically and radiographically (Fig. 3) and the implants were well prepared to receive the prosthesis. The second stage surgery was performed in which cover screws were removed and healing abutment were inserted into the implants (Fig. 4). After a time period of two weeks, peri-implant soft tissue healing was examined, and existing denture was relined after relieving at the abutment site. Later, the healing abutment is removed using a 1.25 mm hex driver. Internal portion of the implant is irrigated and dried to make sure if it is free of debris and soft tissue. A periodontal probe was used to measure the gingival cuff height at the right and left canine site of implant location. Selected ball abutment were placed onto each implant using 1.25 mm hex driver and 30 Ncm torque wrench (Fig. 5).



**Fig. 3: Orthopantomograph taken after 3 months of placement of implants which shows presence of osseointegration**



**Fig. 4: Cover screws were replaced with healing abutments**



**Fig. 5: After 2 weeks, healing abutment were replaced with ball abutments**

A transferable mark with an indelible pencil is placed on top of each ball abutment and old denture is seated to ideally determine the location for attachment housings. It is followed by preparation of recesses in the intaglio surface of the denture to accommodate the housings (Fig. 6). Lingual vent holes are made for escape of excess acrylic. Placement of nylon processing insert into each of the housings is done with insert seating tool. Seating of the attachment housing onto each ball type abutment is done (Fig. 7). Undercuts are blocked out under the housing and soft tissue to prevent acrylic resin from locking the denture onto the abutment. Application of self curing acrylic is done into recessed area and around titanium housings for bonding of the housings to denture. Insertion of denture was done and guiding the patient into proper occlusion with

the opposing arch. After the curing of acrylic, denture is removed. Excess acrylic is removed around the housings and lingual vent hole later it is polished (Fig. 8). Replace nylon retention insert instead of processing insert into the housings. The insert must seat securely in place and be in level with the housings rim. Overdenture is seated over the ball abutments (Fig. 9-11). Proper instructions have been given to the patient on insertion and removal of prosthesis (Fig. 12). The patient was recalled at 1 week, 3 weeks, 3 months, 6 months follow up appointments.



**Fig. 6:** Preparation of recesses in the denture to accommodate space for the housings



**Fig. 7:** Placement of attachment housings along with the processing insert onto each abutment



**Fig. 8:** After the acrylic has cured, removal of denture is done and polished



**Fig. 9:** Final placement of the removable complete denture prosthesis



**Fig. 10:** Balanced occlusion attained on right side



**Fig. 11:** Balanced occlusion attained on left side



**Fig. 12:** Extra-oral view of the patient after placement of complete denture prosthesis

### Discussion

For atrophic mandibular ridge, implant supported overdentures proves to be the most efficient of all. Considering the financial resources of the patient and also the presence of inferior quality of bone in posterior

region compared to anterior of the same arch creates the need for the placement of two implants with ball attachments in the anterior region of mandibular arch which is located anterior to foramens.<sup>(5)</sup>

The use of two implants has shown to be biomechanically sound which provided better prosthetic stability and prevented rotational forces of the components.<sup>(6-7)</sup> By placement of two independent implants at the same height, equidistant from the midline and parallel to each other with proper angulation prevents wearing away or disengagement of the attachments.<sup>(8)</sup> Additionally, the posterior region of the overdenture rocks downward resulting in soft tissue loading over buccal shelves for support also with hinge rotation being 90 degree to the rotation path avoids various complications such as abutment screw loosening, crestal bone loss and implant failure.<sup>(9-12)</sup>

Though nowadays, single piece implants have become popular due to its innumerable benefits, correct angulation is the most catastrophic mistake thereby achieving parallelism becomes crucial. So in this case conventional two piece implants were chosen over the single piece implants.

Relatively, success rate of two implants is equivalent to that of the overdenture supported by four or six implants hence replacement of edentulous mandibular ridge with two implants in the anterior seems to be a logical treatment solution.

## Conclusion

There are numerous approaches to treat edentulous patients, however those techniques are invasive, expensive and time consuming but implant supported overdenture prosthesis proves to be relatively easy due to its innumerable advantages. Incorporating it into dental practice will not only serve many elderly and maladaptive patients who are edentulous but they also increase the patient satisfaction and enables them to function normally in the society. Thus, proving to be a practicable treatment modality for producing trustworthy long term results.

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