

## Case Report

### Prosthetic Management of Edentulous Mandible using Endosseous Implants by Overdentures and Hybrid Dentures: Two Case Reports

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#### Abstract:

The totally edentulous patient has several options for implant treatment including fixed and removable solutions. The mastication, phonation and esthetics: The trident factors are very important and should be given due consideration when any dental procedure is initiated to achieve the successful outcome of treatment. The choice of a suitable prosthesis for a specific case is determined to a great extent by the underlying residual bone as well as the mucosa. Recent scientific studies carried out over the past decade have determined that the benefits of a mandibular two implant over denture are sufficient to propose the two implant over denture - rather than conventional denture - as the first treatment option. This in the prosthodontics literature has led to shift in therapeutic philosophy regarding restoration of the edentulous patient. This article presents rehabilitation of a complete edentulous mandibular arch with an implant retained mandibular over denture and hybrid denture - two case reports.

**Keywords:** Edentulous mandible, Implants, Over dentures, prosthesis.

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#### Introduction

Tooth loss is a serious life event.<sup>1</sup> According to the WHO criteria edentulism is a form of physical impairment,<sup>2</sup> the loss of all teeth causes a disability for most people who wear conventional dentures (CD) as they may have difficulty in performing two essential tasks; eating and speaking. The old joke in dental school regarding dentures was you should charge sufficiently from the patient for the upper one and don't charge them for the

lower. That way when they come back and complain about the lower you can say, "What did you expect, you got it for free?" The truth is, very few patients are happy with their lower complete dentures. Redford et al showed that over 50% of mandibular complete dentures have problems with stability and retention.<sup>3</sup> In this regard, rehabilitation by means of implants offers significant improvements over conventional

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prostheses, improving both patient satisfaction and the quality of life.<sup>4-5</sup> Currently, various forms of treatment for edentulous patients complaining of retention and / or unsatisfactory stability are available, as such implant-supported overdentures and fixed hybrid prostheses.

**Overdenture:** Any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants called also overlay denture, overlay prosthesis, superimposed prosthesis.

**Hybrid Denture:** An implant-supported fixed denture is sometimes referred to as a "hybrid" denture or fixed denture. The term "hybrid" refers to the fact that an implant-supported fixed denture is fabricated with both metal and plastic, making it a hybrid of the two. A hybrid denture is a denture in the sense that the teeth are denture teeth and the pink are the same materials that find in a complete denture or partial denture, but its supported by a metal frame that is screwed into the implants. This article presents rehabilitation of a complete edentulous mandibular arch with an implant retained mandibular over denture and hybrid denture - two case reports.

#### Case Report 1: Mandibular two-Implant- Retained Overdenture

A 55-year-old male patient reported to the Department of Prosthodontics with the chief complaint of loose lower complete denture prosthesis. The patient was unable to eat or speak properly as the lower denture was loose. He gave a history of losing his teeth 5 years back due to caries and periodontal disease. He has been using his current set of

dentures for the past 2 months and has the complaint of loose mandibular complete denture. Clinical examination revealed that the patient has completely edentulous upper and lower arches. The ridge was U shaped, smooth with no irregularities, no bony spicules or root pieces, but the mandibular ridge was found to be resorbed (figure1). However, the maxillary ridge was favorable for conventional denture construction. Maxillary and mandibular diagnostic casts were made, a panoramic radiograph were taken to assess the bone for selection of implants. Radiographic examination of the patient showed that the patient had dense compact bone in the mandibular anterior region without any pathology.



**Figure 1 (A):** Maxillary edentulous ridges

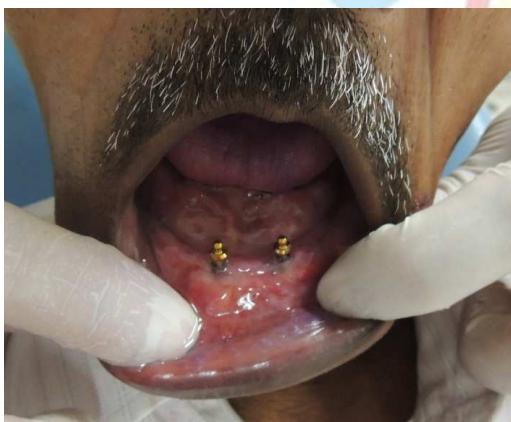


**Figure 1 (B):** Mandibular edentulous ridges

A treatment plan was prepared after a standard protocol that took into consideration the patient's desires, treatment alternatives, and treatment costs. The plan included fabrication of a conventional complete denture for the maxilla and a mandible after that the mandibular denture was modified to gain support from 2-implants.

### Clinical Procedure

In stage one surgery two implants ( $3.75 \times 10$ ) (Adin Dental Implant System Ltd; Afula, Israel) were placed in the anterior mandible at B and D region. Sutures were given and patient recall after 1 week. After one week sutures were removed and the existing mandibular denture was given as a temporary prosthesis during the healing phase. A second stage surgery was carried out to place healing abutments 3 months after the primary implant surgery. Healing abutments were fastened to the implants to allow undisturbed soft tissue healing. After 1 week ball attachments were attached with the implants. (Figure 2) The intaglio surface of the mandibular denture was relieved to provide space for the o-ring attachments. (Figure 3)



**Figure 2:** Ball attachments with implants

A standard chairside autopolymerizing resin mix was then prepared and placed into the denture. Denture was placed and the patient

was asked to close in function over the implants with the o-rings attached.



**Figure 3:** Intaglio surface of the mandibular denture

Denture was removed from the patient's mouth just before final set; excess acrylic material removed and replaced back to final set. After fishing and polishing of denture containing the o-rings, occlusal equilibration was done intraorally. (Figure 4)



**Figure 4:** Intraoral view showing denture insertion after occlusal equilibration

### Case Report 2: Mandibular Implant-Retained Hybrid Denture

A 46 year-old female patient came to the Department of Prosthodontics for dental reconstruction. The patient had partially dentulous maxillary arch and completely edentulous mandibular arch. She had lost her teeth due to periodontal disease. Initially a removable complete denture was fabricated

for the mandibular arch. But the patient's desire was to eliminate a removable prosthesis in the mandible. Therefore fabrication of screw retained implant-tissue supported hybrid prosthesis was planned for the mandibular arch.

### Clinical Procedure

A full thickness mucoperiosteal flap was raised in the mandibular arch from distal to mental foramen on one side to mental foramen on the other side. In the right quadrant, implants (Tapered self-thread, ADIN implant system) were placed in the 2nd premolar ( $3.5 \text{ mm} \times 11.5 \text{ mm}$ ) and canine ( $3.5 \text{ mm} \times 13 \text{ mm}$ ) regions. In the left quadrant, implants were placed in 2nd premolar ( $3.5 \text{ mm} \times 11.5 \text{ mm}$ ) and canine ( $3.5 \text{ mm} \times 11.5 \text{ mm}$ ) regions. A total of four implants were placed in the mandibular arch. (Figure 5) The flap was closed with sutures. After 1 week, the sutures were removed.



**Figure 5:** Implant placement in the mandibular arch

After a waiting period of 1 month, an OPG was obtained to evaluate the bone to implant contact percentage and later stage II surgery was performed under local anesthesia cover screws were exposed and healing abutments were placed. (Figure 6)



**Figure 6:** Intraoral View showing healing abutments

### Prosthetic Phase:

Prefabricated removable mandibular complete denture was used as a special tray and it was trimmed in the anterior region so that adequate space can be obtained for the impression material between the tray and implants. After 1 week, when the soft tissue has grown around healing abutments, the healing abutments were removed, and impression copings were connected to the implants for the open-tray technique.

A two-piece implant transfer system was utilized, consisting of square shaped impression copings and long fixation screws allowing precise connection to the implant. The copings were attached to the implants with a Hex Tool. The tray had an open window to allow for the internal screw to be loosened, as the body of the transfer post will remain within the impression. Before making impression, tray adhesive was applied to the open-tray. The tray was then filled with the addition silicone impression material (Exaflex, vinyl polysiloxane impression material, U.S.A.) and delivered over the impression copings and lower arch. The impression copings were incorporated into the impression. With the tray still in place, the retaining screws were unscrewed and removed. Then tray was removed, capturing the impression copings in the impression material.

After removing the impression tray, implant replicas were connected to the impression copings which were still in place in the impression material. Screw impression copings and replicas together with the Hex Tool. The replicas were held in place to prevent rotation of the impression copings. A layer of petroleum jelly was applied over the impression around the implant replicas, after that one thin layer of light body addition silicon impression material (Examix NDS, Hydrophilic Vinyl Polysiloxane Impression Material, Gc America Inc. ) was applied around implant replicas to simulate the soft tissue around them. The healing abutments were again attached to the implants and patient was sent. In the lab, impressions were poured in die stone (Denstone, dental stone plaster, M.P, India) Master casts were recovered. The Implant replicas were embedded inside the master cast. Metal abutments were attached to the implant replicas incorporated into the master cast, to get a rough idea of the inter-arch space required for the fabrication of mandibular hybrid prosthesis. Record bases and occlusion rims were fabricated. Patient was recalled for recording of maxillomandibular relations and tooth selection. Master casts were then mounted on an articulator. The framework was waxed, cast, recovered, and fitted on the master cast. The fit was refined until the framework seated passively on the master cast. The mandibular denture teeth were waxed to the hybrid framework, and a final wax try-in was performed to verify and correct maxillomandibular relations. At this appointment, the customized abutments along with the framework were connected to the implants for the final wax try-in. The investing, flasking, and processing procedures for the hybrid prosthesis were then completed. (Figure 7)



**Figure 7:** The hybrid prosthesis was finished and polished.

The prosthesis was finished and polished, the hybrid prosthesis was screw retained and composite resin was used to cover screw access hole. Hygiene techniques were reviewed, and patient was scheduled for recall and maintenance.

### Discussion

Treatment involving two independent implants without rigid interconnection is an important consideration with mandibular overdenture treatment. Data support the use of independent implants for a mandibular overdenture.<sup>6-8</sup> When using B and D implants, the anterior movement of the prosthesis is reduced and the prosthesis even may act as a splint for the two implants during anterior biting forces, thereby decreasing some of the stress to each implant. But most situations do not allow for this. With certain disadvantages like psychological feeling of a removable appliance, need for frequent attachment change, relines and prosthesis movement OD 1 is used as a treatment option, when patients understand that additional implant support is beneficial but financial constraints require a transition period of few years before placing additional implants.<sup>9</sup>

**Advantages:**

1. Less expensive
2. Good aesthetics
3. Restore facial profile
4. Removable.

**Disadvantage:**

1. A surgical procedure for implant placement and a period of healing is necessary before the prosthesis may be completed.
2. Dental implant procedures may entail an increase in initial cost compared to conventional dentistry.
3. Mechanical fracture of abutment screws and loosening of screws can occur. Reported occurrences are less than 2-5% of patients.

A fixed detachable (hybrid) denture is secured to the implants and is only removable by the dentist or hygienist. One major advantage of a fixed detachable (hybrid) denture versus an overdenture is that the hybrid denture is not removable. The hybrid denture is always held securely in place and can only be removed by the dentist or hygienist. The rehabilitation of edentulous patients with hybrid dentures has been observed to achieve greater masticatory function and psychological satisfaction than with conventional over-dentures.<sup>10</sup> The hybrid denture is made to leave a space between the denture and the jawbone to enable clean easily underneath the denture without the need to remove it. Two times a year, it is recommended to visit the dentist, to enable your hybrid denture be unscrewed and a professional cleaning done.

**Advantages of hybrid denture:**

1. Hybrid denture restores new teeth and gums to give a proper esthetic and facial support with best natural looking beautiful smile.

2. It feels like a real natural tooth.
3. Hybrid dentures are stable and do not move like conventional dentures.
4. Implant hybrid dentures cannot be removed by patients but can be removed by the dentist for maintenance if required.
5. Are much less expensive than crowns on individual implants.

**Disadvantages:**

Need to clean under the denture flanges and Denture teeth may require maintenance over time.

**Uses**

Hybrid dentures are commonly used when there is a severe bone loss due to periodontal disease and long term denture wearer.

**Conclusion**

The standard treatment of the edentulous patient has, for many years, been a CD. Many CD wearers have significant problems in adapting to their mandibular prosthesis. The widespread use and abuse of denture adhesives is a good indication because these prostheses are inadequate in relation to retention and stability.

CDs have many disadvantages such as: continual ridge resorption with fibrous replacement, instability of the CD, displacement of the CD, variable levels of acquired muscular control, changes in facial support, reduced masticatory efficacy and emotional distress from tooth loss. From the evidence presented in this paper it can be concluded that the edentulous patient restored with an implant supported hybrid denture and overdenture experiences more satisfaction with their prosthesis, improved masticatory ability and nutrition, along with improvements in psycho-social aspects of life.

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