

Implant Supported Mandibular Overdenture: A Viable Treatment Option For Edentulous Mandible

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Abstract

The prosthetic management of edentulous patient has been a major challenge since long. Complete maxillary and mandibular dentures have been the traditional standard of care for edentulous patients and for elderly. However, most of the patients report problems adapting to their mandibular denture due to a lack of comfort, retention, stability and inability to masticate. This is because of inadequate alveolar ridge height which occurs following resorption of bone. Implant-supported overdentures have been a common treatment for edentulous patients in the past years and predictably achieve good clinical results. Implant supported overdentures offers a practical advantage over conventional complete dentures and removable partial dentures. These include decreased bone resorption, reduced prosthesis movement, better esthetics, improved tooth position, better occlusion, increased occlusal function and maintenance of the occlusal vertical dimension. This article presents a case of the implant-retained overdenture.

Keywords: Overdenture, Implant supported mandibular over denture, Flexible Denture.

Case Report

A 68-year-old male patient reported to the department of prosthodontics, crown and bridge, Hi-tech dental college and hospital for the prosthodontic rehabilitation of his edentulous jaws. The chief complaint of the patient was ill fitting mandibular denture which he was wearing since 5 years. Past medical history was not significant. His dental history included extraction of the periodontally weakened teeth which he had done extraction 6 years back. Those dentures were relined on several occasions attempted by other clinicians to achieve a proper retention/fit of the denture. Clinical examination included an evaluation of size and shape of the edentulous ridge, palpation for undercut and an assessment of condition of the mucosa as the patient is a denture wearer since 5 years. Clinical examination revealed completely healed maxillary and mandibular edentulous ridges. Mandibular ridge exhibited a severe degree of alveolar ridge resorption in posterior region and moderate degree of resorption in anterior region. Overlying mucosa was healthy and normal. Temporomandibular joint examination was found to be normal. Evaluation of the existing dentures revealed inadequate denture extensions making the denture poor in retention and stability. Evaluation of maxillary arch with missing tooth in relation to 11, 12, 14, 16 and 22 was seen. Orthopantomograph was advised to evaluate bone availability and architecture [Fig-1].



Fig 1:- OPG

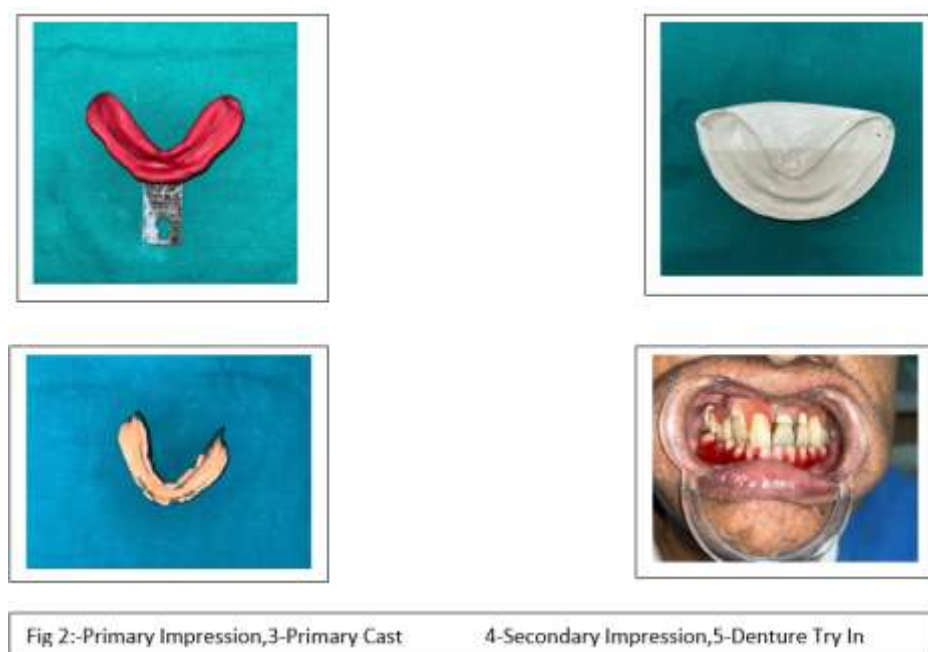
The inter-ridge distance was assessed. Routine blood examination revealed no abnormal findings. A treatment plan was prepared after a standard protocol. It included fabrication of a flexible partial denture irt 11,12,14,16,22 for the maxillary arch and a 2 free standing implant-supported overdenture for the mandibular arch. Position near the canine region were selected for implant placement [1]. This decision was taken considering the resorption of the posterior region and availability of good bone in canine region. This treatment plan was explained to the patient and was approved by him.

Treatment procedure:

Maxillary partial denture and mandibular Complete Dentures were fabricated in a conventional manner. Primary Impression was made using impression compound(Y-Dents Impression Compound) for lower arch and with alginate (Zhermack Tropicalgin) for upper arch to proceed with flexible denture of upper arch. Cast was made out of it followed by special tray fabrication with self cure PMMA material.

Border Moulding was done and Secondary impression was made with Zinc oxide eugenol impression paste. All procedures till maxillary and mandibular trial dentures were done and patient was called for try in. Lingualized occlusion with Semi-anatomic tooth form was selected for the patient. Deflecting contacts in both centric and eccentric positions were removed.

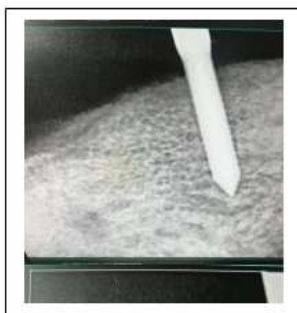
After Try in denture fabrication was done for lower denture using conventional technique such as flasking, De Waxing, Packing, Curing, Packing, Finishing and Polishing of denture and flexible denture for upper arch.[Fig:- 3,4,5,6].The patient was given instructions regarding maintenance of denture.



In the second Stage, Implant placement at canine region was placed following all surgical protocols. Novodent swiss medtech (Implant™) implants of 10 mm length and 3.5 mm diameter were selected.[Fig6,7]. It was decided to use ball and socket type of attachment system.[3,4] Implant surgery was carried out in a 2-stage surgical protocol. Surgery was performed under local anesthesia. The osteotomy sites were prepared in the canine region with the help of denture fabricated. A guide pin was used inside the patient's Mouth to ensure that the second implant was as parallel as possible to the first [Fig 8]. The selected implants were placed at the prepared sites [Fig 9]. Surgical cover screws were placed. The flaps were approximated with primary closure.



Fig:-6 Crestal Incision Given and Flaps Elevated



7-Pilot Drill at the canine Region Given



Fig 8 :- Paralleling Pins in Patient's mouth



Fig 9:- Implant Placed



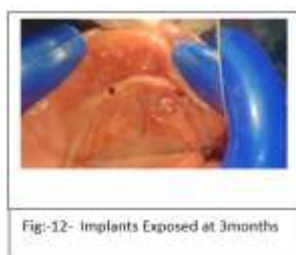
Fig 10 :- Implant Placed with coverscrews on both side



Fig 11 :- Flap closed with cyanoacrylate bio adhesive

The patient was asked not to wear the lower denture for two weeks following surgery. Antibiotics were prescribed for seven days. Patient was recommended to use mouth rinse (chlorhexidine gluconate 0.2%) 3-5 times daily. Necessary instructions were given regarding maintenance of oral hygiene. The sutures were removed in two weeks. Normal diet was resumed by the patient after 2 weeks of implant placement. The intaglio surface of the denture was relieved. Soft tissue conditioning material (GC Reline Soft TM) was applied to the intaglio surface of the denture according to the manufacturer's directions and the excess liner material was trimmed. The denture was finished, polished and inserted into the patient's mouth. This allowed the patient to wear the removable prosthesis during the period of osseointegration without transmitting excessive forces to the surgical sites. The patient was seen on a regular follow-up visits relined as when needed. Three months later and after confirmation of the osseointegration, the patient was presented for the second stage surgery. At this stage, the implants were exposed, the surgical cover screws were removed and the sites were irrigated with sterile normal saline (Normal saline Flush)[Fig-12] Healing abutments was placed and the gingival tissues were allowed to form giving an esthetic appearance.[Fig-13] Mandibular denture was relined with a soft-tissue conditioning material (GC Reline Soft TM). After one month, the

comfort and fit of the dentures was checked before proceeding with the addition of attachments. Ball and socket over-denture abutment of 2 mm diameter was selected [Fig-14]. Seating of the abutments was verified.



The attachments were placed and O rings were blocked-out on the abutments with help of latex gloves [Fig:-13]. Acrylic resin from the intaglio surface of the denture was removed to allow passive fit of the denture against the tissue. Pressure indicating paste (Mix of ZNOE Powder and Sterile Water) was used to verify that no contact of the denture base with abutment or attachment¹. A No. six round bur was used to vent the pick up space toward the surface of the denture. The vent was situated lingual to the denture teeth. The pick-up space was half filled with Self Cure Acrylic Resin and the mandibular denture was placed over the abutments [Fig:-14]. The complete seating of the denture was verified and the patient was asked to maintain light occlusal pressure in the centric relation position while the resin polymerizes. The pick-up resin was trimmed and polished in the venting area. Fit and occlusion of the dentures was rechecked in centric relation position [Fig15].



Home care instructions were given to the patient. The patient was trained to place and remove the prosthesis properly. First recall was attended after 24 hours. The regular follow up was advised every

six months. Patient was instructed to remove their prosthesis at night. A soft single-tufted brush was indicated to keep attachments free from plaque and calculus.

Discussion

The implant-supported overdenture maintains stability during mandibular movements. This stability enables the tongue and perioral musculature to function more normally, as they are not required to control mandibular denture movements [2,5]

The design of the implant-retained overdenture can be carried out in 2 ways [2,3,6]. In the first approach, implants are splinted with a rigid interconnecting bar that incorporates an attachment mechanism for the overdenture retention. In the other approach, implants are not connected to each other and the retention mechanism is provided by an abutment that incorporates some form of retentive mechanism. A major advantage of the freestanding implants is the fact that they allow for the use of the prefabricated stock retentive abutments. The use of the interconnecting implant bar requires additional laboratory and clinical procedures for its fabrication and the associated increase in treatment cost. However, in case of the misaligned or malpositioned implants, stock abutments may not provide the desired compensation and the splinting of the implants with the interconnecting bar can overcome these problems.

Another advantage of the prefabricated stock abutments is that the abutment itself can be easily replaced in case of abutment failure. Because stock abutments are identical, their replacement does not require remaking the overdenture. On the other hand, if the implant interconnecting bar has to be remade in the case of failure, it usually requires remaking the overdenture. Performance data of the implant-retained overdenture indicate that most of the complications and prosthodontic maintenance are related to the attachment components of the overdenture [3,7-9].

Another dilemma associated with overdenture treatment is the technique of incorporating the attachment matrices into the overdenture literature. One approach includes incorporation of the matrices into the overdenture in the dental laboratory. This is an extremely important step and, if not performed correctly, can negatively influence overdenture fit or contribute to the dislodgement of the matrix from the overdenture. This method ensures acceptable fit of the overdenture. However, it requires additional clinical time and is technique sensitive. The other approach is pick-up intraorally in the clinic [9-12]. In this case four free standing implants were placed in A,B,D and E position. As the posterior ridge was resorbed, it was thought that it would not offer any support to the denture. In two implants retained overdenture the rotational movement is of PM6 type which is harmful for the implant as well as to the residual ridge [1]. Therefore, support was obtained from four 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 placing the implant in C position.

As with any treatment modality, aftercare and maintenance is vital if the overdenture is to be successful. The patient must be advised of this and reviewed regularly. Optimal surgical implant positioning is essential for the success of implant supported restorations. An implant-retained overdenture requires meticulous treatment planning than a conventional complete denture. Final placement of the implants should follow the principles of ideal implant parallelism and maximum initial stabilization, and path of placement and removal.

Conclusion

The edentulous mandible is difficult to restore. An implant-retained overdenture is a straightforward and reasonably priced option for the rehabilitation of the edentulous mandible among other treatment options. Even though this treatment is widely accepted, there are still some debates about the best ways to fabricate the overdenture, how to choose the right attachment method, and how to design the overdenture. Dental technicians and clinicians must follow good design concepts including ease of maintenance and simplicity in construction.

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