Content available at: https://www.ipinnovative.com/open-access-journals

IP Annals of Prosthodontics and Restorative Dentistry

Journal homepage: https://www.aprd.in/

Case Report

Implant-supported overdenture- An alternate treatment option for severely resorbed mandibular ridge

Shri Krishna Prasanth[1,*], Siddhant Vilas Dandawate[2], Syed Abdul Qayum[3], Divya Jivrajani[4]

[1]*Dept. of Oral and Maxillofacial Surgery, SRM Dental College, Chennai, Tamil Nadu, India*
[2]*Private Practice, Maharashtra, India*
[3]*Private Practice, Hyderabad, Telangana, India*
[4]*Private Practice, Jaipur, Rajasthan, India*

ARTICLE INFO

Article history:
Received 06-08-2022
Accepted 23-08-2022
Available online 30-09-2022

Keywords:
Mandible
Implantsupported overdenture
Conventional denture
Implant
Osseointegration

ABSTRACT

Rehabilitation of the patient with resorbed ridge has been a challenging procedure. Replacement with complete dentures has been the most common traditional standard of care. But there were many drawbacks in the atrophic mandible which includes lack of comfort, retention, stability, and inability to masticate. To overcome this drawback implant-supported over-denture came into use. The advantage of implant-supported over-denture over other treatment modalities are as follows: decreased bone resorption, reduced prosthesis movement, better esthetics, improved tooth position, better occlusion, increased occlusal function, and maintenance of the occlusal vertical dimension. In this article, we discussed the placement of two implants in the inter-canine region of the mandibular ridge and providing a conventional denture. Three months later this complete denture was converted into implant-supported mandibular over denture.

This is an Open Access (OA) journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

The interest in replacing missing teeth with dental implants has been increasing exponentially.[1] In such conditions, acceptable bone volume is an important prerequisite for an expectable long-term prognosis in the field of implant dentistry.[2] Rehabilitation of mandible using implant-supported overdenture is quite challenging and technique sensitive. However, the Osseo-integrated implants play a vital role in their fabrication and provide better stability and support, especially in resorbed ridges.[3] Three important factors are to be considered in the case of an overdenture. First, the medical condition of the patient, second, the skill of the multidisciplinary team, third and last is the affordability of the patient.[4] Certain patients do not get easily satisfied with the conventional dentures hence, the best treatment option is mandibular overdentures supported by 2 or more implants. In this article, we would be discussing the rehabilitation of mandible using implant-supported overdenture.

2. Case Report

A partially edentulous 39 years old male patient presented with the chief complaint of mobile teeth in the upper and lower jaws. Medical and dental records showed no relevant history. Complete clinical and radiological examinations were done. Clinical examination was done to assess the mobility of teeth and ridge morphology. All the teeth were found to be in grade II and grade III mobility and the ridge appears to be normal with healthy overlying mucosa. Orthopantamogram was taken to evaluate the

* *Corresponding author*.
E-mail address: prasanthkrishnan849@gmail.com (S. K. Prasanth).

https://doi.org/10.18231/j.aprd.2022.035
2581-4796/© 2022 Innovative Publication, All rights reserved.

bone radiographically (Figure 1). A moderate degree of alveolar bone loss was seen. No abnormality was associated with TMJ. Routine blood investigations were done and it appeared to be normal. After complete discussion, the standard protocol was designed for rehabilitation of the maxilla and mandible. It encompasses conventional complete denture in the maxillary arch and Implant-supported overdenture in the mandibular arch. Position B and D were selected for implant placement.[4]

Counseling was given to the patient and treatment protocols were explained. Informed consent was taken. Initially, complete extraction of all teeth was performed and alveoloplasty was done at the same appointment. The mucosa was allowed to heal for 15 days. After the healing period, the patient was recalled and the maxillary and the mandibular conventional complete denture was fabricated. Simultaneously implant placement in the lower arch was planned.

2.1. Surgical procedure

The implant surgery was carried out as a two-stage procedure. Under all aseptic conditions, LA was administered. Position B and D were marked using the help of an acrylic splint. Flap reflection was done followed by successive osteotomies. Parallelism was checked using guide pins. Two implants of 3.5*10 size were placed and the cover screw was tightened (Figures 2 and 3). The flap was approximated using 3-0 silk sutures. The patient was advised not to wear the denture for 2-3 weeks. This will aid in the proper healing of tissues. Antibiotics and analgesics were prescribed. Postoperative and oral hygiene instructions were given. After 1 week, sutures were removed. Regular follow-up of the patient was done. The denture was polished and finished and the patient was asked to wear the denture during this osseointegration period (Figure 4). Spacer wax was placed during the fabrication of the denture to prevent loading during the healing period. The denture was relined as per the needs. After 3 months, 2nd stage surgery was planned. The cover screw was removed and healing abutments were placed for about 2 weeks for gingival tissue to form around them.

2.2. Loading of implants

Before installation of attachments, comfort and fitness of denture was assessed. According to soft tissue thickness ball and socket abutments (Figures 5 and 6) of 3 mm were selected. The soft tissue thickness was checked by William's probe. Ball attachments were fixed to the implant. A vent was made in the denture using a round bur for the pick-up space toward the surface of the denture. The vent was situated lingual to the denture teeth (Figure 7). The pick-up space was half-filled with Pattern Resin and the mandibular denture was placed over the abutments. The complete seating of the denture was ensured and the patient was requested to maintain slight occlusal pressure in the centric relation till the resin polymerizes. The pick-up resin was then trimmed and polished in the vent area. Finally, an overdenture was given to the patient and regular follow-up was advised (Figure 8).

Fig. 1: Preoperative OPG

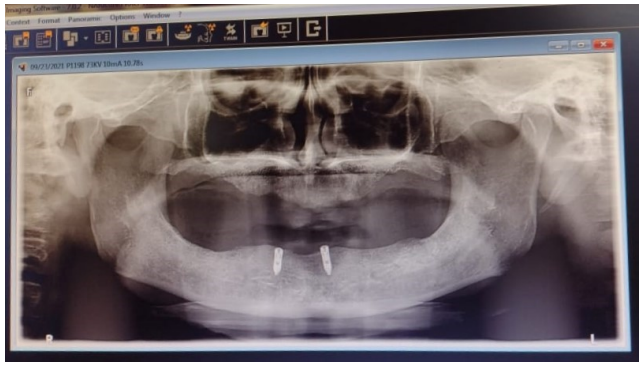

Fig. 2: Implant placement

3. Discussion

Complete edentulism occurs twice in a lifetime. First at birth and next at the time of old age. It usually depends on how we maintain oral hygiene.[2] Resorption of mandibular bone occurs continuously. Severely resorbed ridge is an adverse anatomical presentation for the normal functioning of conventional complete dentures.[5] Compared to the maxilla, mandibular bone resorption occurs in a greater dimension during 1st year of extraction.[5] Yet some patients adapt to the denture according to the morphology. This is determined by the adaptation of the tongue and perioral musculature to the new position and preventing the displacement of denture.[2]

Loosening of the denture can be overcome by the use of Osseointegrated implants in the mandible. Various studies show the use of single to multiple implants for the

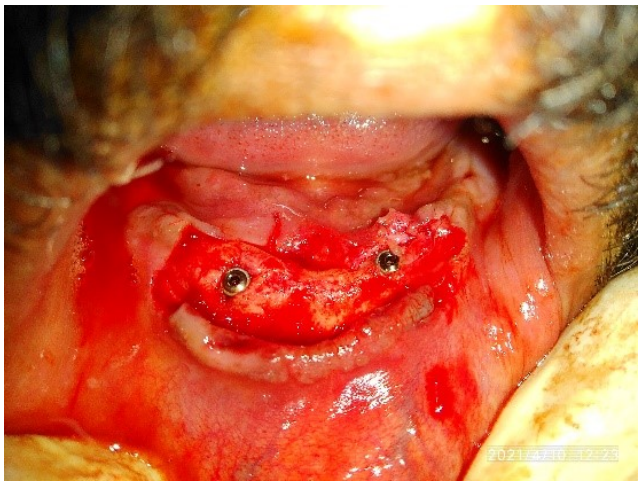

Fig. 3: OPG after implant placement

Fig. 4: Denture during the healing period

Fig. 5: Ball and socket attachment

Fig. 6: Intraoral placement of ball and socket

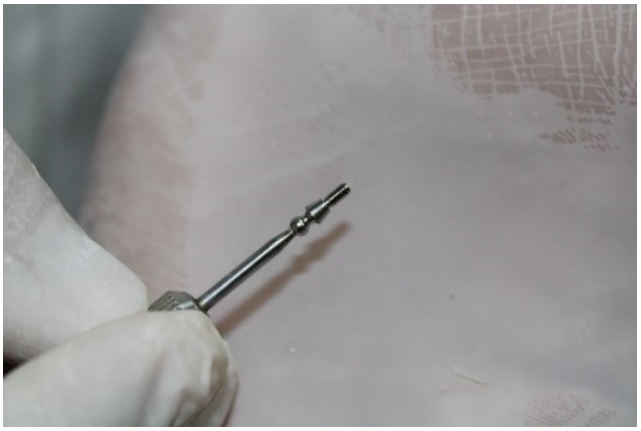

Fig. 7: Making of vent

Fig. 8: Final prosthesis

fabrication of overdenture to provide predictable prosthetic results.[6] With the help of an implant-supported overdenture, the normal function of the tongue and perioral musculature can be better restored.[4,7,8] In a case study, 2 implants were used in an edentulous mandible for rehabilitation using over denture the results showed a 98% of success rate in 52 months follow-up.[9] Another study showed a lesser marginal bone loss in a patient with 2 implants when compared with that of 4 implants.[10]

Moving to fabrication of denture. There are two ways of fabricating implant-supported overdenture. First, splinting with rigid interconnection bar and second, implants are not connected and retention provided by the abutment. The advantage of a free-standing implant is that it will allow using a pre-fabricated stock abutment. However, in the case of a malpositioned implant, a prefabricated stock abutment will not provide desired results. In that case, bar attachment is preferred. Whereas disadvantages of an interconnecting bar are 1) additional lab and clinical procedure for its fabrication, 2) high cost, 3) in a case of failure refabrication of abutment is necessary. The most important advantage of a free-standing abutment, it can be replaced in case of any failure.[11–13]

The next doubt is whether to go for the laboratory/clinical method for the incorporation of matrices in overdenture. This is the most important step in the fabrication of overdenture. In this case, we did a clinical pick-up method to avoid any discrepancies in the denture. Literature shows a decline in the rate of bone resorption with the use of overdenture as compared to the conventional denture, implying a less frequent need for relining and rebasing.[14]

Fabrication of overdenture with a ball and O-ring attachment is not cumbersome and errors can be easily rectified. Two dental implants with the ball and O-ring attachments are largely sufficient. Ball attachment was used because of several advantages and they are 1) less technique sensitive, 2) less expensive, 3) makes peri-implant hygiene easier, 4) it can be used with existing conventional dentures.[15] It also provides better stability and equal distribution of load.

Meticulous treatment planning is most important for the fabrication of overdentures. Implant positioning is very essential for the success of implant-supported restorations. Principles of ideal implant parallelism and maximum initial stabilization and path of placement and removal should be followed. Ideal positions provide proper load distribution. Apart from implant factors that are considered for the success of the prosthesis, maintenance of overdenture is also important. The patient must be advised about denture hygiene and regular review was must be done.

4. Conclusion

Restoration of a completely edentulous jaw is quite challenging. Especially, rehabilitation of mandible is crucial because of the high resorption rate. There are various treatment options available, among those restoration with implant-supported dentures provides better results by overcoming the action of the tongue and perioral musculature. Despite its advantages, many controversies are also present with this treatment plan. Implants are not easily acceptable by many patients in poor nations due to the higher treatment cost associated with such prostheses. The number of implants planned and the systemic conditions of the patient will also be considered as the main factor. Overdenture with 2 implants provides better results for improving the quality of denture and life of the patient.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Lambade D, Lambade P, Gundawar S. Implant supported mandibular overdenture: a viable treatment option for edentulous mandible. *J Clin Diagn Res*. 2014;8(5):4–6.
2. & Rathi N, & Goswami R, Mattoo K. Implant Supported Mandibular Overdenture-Case Report. *J Adv Med Dent Sci Res*. 2019;7:128–30.
3. Doundoulakis JH, Eckert SE, Lindquist CC, Jeffcoat MK. The implant-supported overdenture as an alternative to the complete mandibular denture. *J Am Dent Assoc*. 2003;134(11):1455–8.
4. Naert I, Alsaadi G, Quirynen M. Prosthetic aspects and patient satisfaction with two-implant-retained mandibular overdentures: a 10-year randomized clinical study. *Int J Prosthodont*. 2004;17(4):401–10.
5. Gupta R, Singh RK, Basnet BB. Dental-Implant Retained Mandibular Overdenture: A Case Report. *Birat J Health Sci*. 2018;5(3):488–91.
6. Albrektsson T, Zarb G, Worthington P, Eriksson AR. The long-term efficacy of currently used dental implants: a review and proposed criteria of success. *Int J Oral Maxillofac Implants*. 1986;1(1):11–25.
7. Timmerman R, Stoker GT, Wismeijer D, Oosterveld P, Vermeeren J, van Waas M, et al. An eight-year follow-up to a randomized clinical trial of participant satisfaction with three types of mandibular implant-retained overdentures. *J Dent Res*. 2004;83(8):630–3. doi:10.1177/154405910408300809.
8. Oetterli M, Kiener P, Mericske-Stern R. A longitudinal study on mandibular implants supporting an overdenture: the influence of retention mechanism and anatomic-prosthetic variables on periimplant parameters. *Int J Prosthodont*. 2001;14(6):536–42.
9. Van Steenberghe D, Quirynen M, Calberson L, Demanet M. A prospective evaluation of the fate of 697 consecutive intraoral fixtures ad modum Brånemark in the rehabilitation of edentulism. *J Head Neck Pathol*. 1987;6:53–61.
10. Cune M, Burgers M, Kampen FV, Putter C, van der Bilt A. Mandibular overdentures retained by two implants: 10-year results from a crossover clinical trial comparing ball-socket and bar-clip attachments. *Int J Prosthodont*. 2010;23(4):310–7.
11. Watson GK, Payne AG, Purton DG. Mandibular overdentures:comparative evaluation of prosthodontic maintenance of three different implant systems during the first year of service. *Int J Prosthodont*. 2002;15(3):259–66.
12. Walton JN. A randomized clinical trial comparing two mandibular implant overdenture designs: 3-year prosthetic outcomes using

a six-field protocol. *Int J Prosthodont*. 2003;16(3):255–60. doi:10.1016/j.prosdent.2003.08.020.
13. Boudrias O, Chehade P, A. Two-implant overdentures with ball attachments: astep-by-step approach. In: JS F, GE C, editors. Implant Overdentures: The Standard of Care for Edentulous Patients. Carol Stream,II: Quintessence Publishing Co; 2003. p. 129–43.
14. Lopez RA, Abad DS, Bertomeu IG, Castillo EG, Otaolaurruch ES. Bone resorption processes in patients wearing overdentures. A 6-years retrospective study. *Med Oral Patol Oral Cir Bucal*. 2009;14(4):203–9.
15. Staubli PE. Attachments and implants. Reference manual. San Mateo, CA: Attachments Int. Inc; 1996. p. 234–45.

Author biography

Shri Krishna Prasanth, Senior Lecturer

Siddhant Vilas Dandawate, Consultant

Syed Abdul Qayum, Consultant

Divya Jivrajani, Consultant

Cite this article: Prasanth SK, Dandawate SV, Qayum SA, Jivrajani D. Implant-supported overdenture- An alternate treatment option for severely resorbed mandibular ridge. *IP Ann Prosthodont Restor Dent* 2022;8(3):175-179.