A 10-Year Follow-up of Rehabilitation of Severely Atrophied Edentulous Mandible with Implant Supported Over Denture: A Case Report

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Abstract

Background: Retention and support for the conventional complete dentures primarily dependent upon the residual alveolar ridge and mucosa. Patients with poor mandibular ridge foundation usually suffer from inadequate denture retention and stability. In such cases, implant-supported overdenture treatment provides improved prosthesis retention and support and thus greatly increasing patient's acceptance toward prosthesis as when compared to conventional dentures.

Case Report: The present case report describes a successful rehabilitation of resorbed mandibular ridge with an overdenture supported by two implants and 10 years of follow-up was performed and discussed.

Conclusion: Implant-supported overdenture provides a strong return for the investment in treatment time and expense. The clinical outcome of this treatment is significantly better than that achieved with conventional mandibular dentures, especially when patients are experiencing technical problems because of compromised prosthesis retention and stability.

Keywords: *Atrophied mandible, ball attachment, implant overdenture, follow-up, Dental Implants.*

Introduction

Dental implants are tooth-root analogue devices inserted into the jaw-bone and have been increasingly used to support different types of dental prostheses such as fixed partial dentures, fixed complete dentures and removable complete dentures.[1] Implant dentistry has improved the patient's satisfaction by improving the retention, stability, function, aesthetics and the same time preserving the residual bone, especially in the mandible. Implant-supported overdentures have expanded rapidly as a successful treatment modality to rehabilitate completely edentulous patients.[2]

Several studies have indicated that the employment of implant supported overdentures within the mandibular bone is an effective and efficient treatment modality[3,4] particularly in patients with excessive loss of residual bone.[5] The survival rate of implants in the front region of the mandibular bone is excellent and the rate of surgical complications is very low. Moreover, implants demonstrate a reduced rate of residual ridge reduction within the anterior mandibular jaw area.[6] The treatment selection depends on the patient's individual needs and treatment modalities along-side their monetary standing. Two dental implants are usually considered the minimal

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number necessary for mandibular implant overdenture treatment.[7] In this case report, patient with resorbed edentulous mandible was successfully rehabilitated using two dental implants placed in the interforaminal region with ball abutments opposing conventional maxillary complete denture and 10 years of follow-up was performed and deliberated.

Case Report: A 54-year-old female patient reported with a chief complaint of loose acrylic complete dentures and difficulty in chewing in year 2010. Patient gave history of extraction 20 years back and since then she has been wearing the denture. The present denture, she is wearing; is her fifth denture. She was not happy with the retention of the denture as her complaint that the denture lifts up during eating and talking. Clinical and radiographic examination [Figure 1] revealed severe alveolar bone loss in the maxillary and mandibular residual ridges. There were no compromising systemic considerations. The blood reports of the patient were checked. The treatment plan was formulated, which comprised of mandibular implant-supported overdenture and conventional maxillary denture. The procedure was explained to the patient and informed consent was obtained. Two implants (A8, Ankylos C/X Implants, Dentsply, Sirona, US) of 3.5 mm diameter and 8 mm length was chosen according to the dimension of the bone. Under antibiotic prophylaxis and standard aseptic protocol, nerve block and infiltration anesthesia was administered. A full thickness crestal incision from first premolar to first premolar was given and muco-periosteal flap was reflected and osteotomy was performed in both the mandibular canine regions. [Figure 2] A paralleling tool was placed to check the implant parallelism and the implants were then threaded into position using a hand ratchet at 30 N cm countersinking the implant crest module at the crestal bone level and cover screw was placed and panaromic radiograph was taken [Figure 3]. On the 7th day of surgery, suture was removed and after 4 weeks the procedure of new complete denture began. Border molding, jaw relation record, try-in and denture delivery was completed [Figure 4, 5]. Twelve weeks postoperatively, osseointegration was evaluated clinically as well as radiographically using panaromic radiograph and both the implants were found to be rigidly fixed with an adequate zone of healthy, keratinized gingiva without any sign of crestal bone loss and the implants were ready to receive the prosthesis. The second-stage surgery was performed and the implants cover screws were removed and healing abutment were screwed into the implant body [Figure 6]. The patient was recalled after two weeks, healing abutments were removed and a periodontal probe was used to measure the gingival cuff height at the right and left canine site implant position and ball abutments were tightened to the implants [Figure 7]. Self-cure acrylic was placed into the relieved space and denture was seated into patient's mouth and allowed to cure, when the patient was biting in centric relation [Figure 8]. After the acrylic is set, denture was removed and modified surface was finished and polished [Figure 9] and panaromic radiograph was taken post-operatively [Figure 10].The patient was instructed for the use of soft brush and floss for maintenance of area around the implant ball abutments. The patient was recalled at one week, one month, three months and six months follow up appointments. The patient was delighted with the adequate retention, stability, comfort and function of the mandibular implant retained overdenture to her complete satisfaction. The occlusion was found stable; the denture and attachments were clean. The attachment system was devoid of any sign of wearing during the period.

In year 2020, the patient reported and mentioned that maxillary denture is fractured in the midline and mandibular denture was loose. She was not happy with the loose mandibular denture. On intra-oral examination, soft tissue covering (gingival cuff) around the implants was found to be healthy and attachment level was higher when compared with ten years ago photographs There was slight plaque accumulation on ball abutments was noted. [Figure 11] On radiographic examination, there was minimal or no bone resorption noted around the implants when compared with ten years ago radiograph. The male attachments were evaluated and found to be loose and were not precisely fitting. The treatment planned was debridement of ball attachment, replace the male component and fabricate the metal based maxillary and mandibular dentures [Figure 12]. After the replacement with new dentures and attachments, patient was highly satisfied with the function and aesthetics.

Discussion

Implant-supported overdenture provides many advantages over conventional denture therapy, like decreased bone resorption, reduced prosthesis movement, better esthetics, increased occlusal function and preservation of the occlusal vertical dimension etc. It is demonstrated that conventional mandibular complete denture produces significantly more patient problems

than maxillary complete dentures, primarily as a result of poor prosthesis retention.[8] Denture retention may be a major problem in patients with severely resorbed ridges, but placement of two or more implants allows optimal retention with patient satisfaction and performance. It has been reported that when implants are placed, the bone gets stimulated by the forces transmitted from implants; resulting minimal bone loss.[9] In the present case report, atrophied mandibular edentulous ridge was rehabilitated with overdenture supported with two implants and after ten years of follow up, minimal or no bone resorption was observed in comparison with the panaromic radiograph which was taken ten years ago. Although the support is shared by the tissues covered by the denture base, two implants usually provide sufficient stability in mandibular ridges.[10] Hygiene condition and residential maintenance procedures are improved with an overdenture.[11] For of these reasons, mandibular two implant overdenture has been described as a customary of take care for edentulous mandibles.[12] The two-implant overdenture therapy may be a consistent and reliable therapy for patients with an edentulous mandible. Many authors have hypothesized that it is appropriate to use two implants with an interconnector parallel to the hinge axis and a resilient overdenture on an ovoid or round bar.[1,13] Survival rates within the two implants supported overdenture groups compared with four-implant overdenture groups appear to be equivalent for patient satisfaction.[14] In the present case report author have placed two implants within the inter-foraminal region to provide retention and stability to the overdenture. The ball abutments were selected as they are cost effective and less technique sensitive, as compared to bar attachment which needs more inter-ridge space. Further, it has been reported that ball abutments are more advantageous with regard to optimizing stress and minimizing denture movement.[15] The anterior mandible has demonstrated a high predictability for implant-tissue integration and consequently, there's no use for planning the position of additional implants in anticipation of potential implant integration failure.[16]

Conclusion

Implant-supported overdentures offer a strong return for the investment in treatment time and expense. The clinical outcome is significantly better than that achieved with conventional mandibular dentures, especially when patients are experiencing technical problems because of retention and stability of the compromised prosthesis. Patients with implant-supported overdentures are highly satisfied with their dentures and show increased efficiency in mastication.

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