

A Simple Technique to Rehabilitate Edentulous Patient with mandibular Overdenture Retained by two Single Piece Bicortical Implants Using Flapless Technique; A Case Report

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Abstract: In completely edentulous patients it is comparatively easy to get retention in maxillary denture due to large surface area than mandibular denture. So conventional complete dentures usually fail to satisfy the expectation of patients because of compromised retention, especially with mandibular dentures. This creates negative effects on the patient's behavior towards prosthodontics treatment. So a rehabilitation modality using mandibular overdenture is a simple, predictable and acceptable treatment option in such situations. Flapless surgery increases patients' comfort and acceptance, and also it minimizes the loss of soft tissue. The case report presents the use of two immediately loaded single piece bicortical implants with ball abutments to retain a mandibular overdenture in a completely edentulous patient using flapless technique.

Keywords: Bicortical implant, Immediate dental implant loading, Implant supported denture, Overdenture.

I. Introduction

The success of mandibular implant-retained overdenture in the prosthodontic rehabilitation of an edentulous patient is well established. The overdenture for completely edentulous mandible is often retained by 2 implants⁽⁴⁾. Edentulous patients often seek dental implants to improve function, self-confidence, and quality of life. Complete edentulism has become a common clinical entity among the elderly and proper management of such patients is a clinical challenge for the Prosthodontist. Conventional removable complete dentures are the most common treatment modality for such patients. Patient's ability to adapt to the mandibular complete denture is a common problem because of lack of proper retention, stability and comfort¹. This often adversely affects patient's functional, social as well as psychological well-being. Since implants can provide the provision of a stable and retentive mandibular complete denture prosthesis. Rehabilitation of edentulism using mandibular overdenture has become a simple, acceptable and a predictable treatment option.

Rehabilitation of edentulous mandible following placement of two implants in anterior mandible was first advocated by Van Steenberghe et al⁵. According to Mc Gill consensus statement on overdentures two implant supported overdentures should be the standard care for rehabilitation of edentulous mandible⁵. Researchers over the past decade demonstrated that the mandibular two implant supported overdenture should be the first treatment option rather than conventional complete dentures^{7,8}.

Case Report

A 50 year old male patient reported to department of prosthodontics, Government Dental College Thiruvananthapuram with chief complaint of missing all teeth and wanted a suitable replacement. Dental history revealed that the patient had been completely edentulous for the past 2 years and he was wearing conventional denture, but he was not satisfied with that denture especially with lower denture. There was no relevant medical history. Clinical examination revealed completely edentulous maxillary and mandibular ridges with adequate amount of keratinized mucosa. Treatment options suggested for the patient were conventional complete denture with bilateral balanced occlusion and implant supported mandibular overdenture. After final discussion with the patient it was decided to fabricate a conventional maxillary complete denture and an implant supported mandibular overdenture. Mandibular ridge had good bone quality assessed clinically as well as by panoramic radiograph (Fig. 1). So it was finally planned to place two single piece bicortical implants (14 mm length and 3.5 mm diameter) with ball abutments at bilateral first premolar region using flapless surgery followed by immediate loading denture.

Technique: Primary and secondary impressions were made in a conventional manner and the maxillary cast was mounted on a Hanau Wide View articulator following a facebow transfer. This was followed by mounting of mandibular cast using centric relation record. Teeth arrangement was done and bilateral balanced occlusion was checked both in articulator as well as in patient's mouth during the Try-in stage. (Fig. 2). Denture

insertion was done after processing like conventional manner and asked the patient to wear this denture for one month, so that patient can adapt to this denture.

The finished mandibular denture was then duplicated in clear heat cure acrylic to be used a surgical guide as well as for measuring restorative space (Fig. 2). A master cast was duplicated before processing the denture. Duplicated clear acrylic denture was kept on the master cast and a putty matrix was made (Fig. 3) and then the putty matrix was cut with a sharp blade over the premolar region, anterior portion of the putty matrix as well as the denture was removed and again placed the putty matrix over the cast and the available space was measured by using calibrated scale (Fig. 4). By this method the available space was assessed three dimensionally. Measurements were taken using cross-sectional putty matrix from the crest of edentulous ridge to the indentation of occlusal plane and there was approximately 11 mm of space for implants placement. The duplicated denture was then mounted on an implant surveyor and optimum parallelism was planned before the preparation of the osteotomy sites.

On the day of surgery denture was checked in patient's mouth and bilateral balanced occlusion was confirmed. After administration of local anesthesia a flapless approach was employed for implant placement. The surgical guide was placed to assess the location and initial osteotomy was done using pilot drill. This was followed by sequential drilling up to D 3.3 mm drill at a speed of 2500 RPM. To achieve parallelism between implants a guide pin was placed in the first osteotomy site (Fig. 5), while preparing the contralateral osteotomy site. Two single piece bicortical implants were placed in the respective osteotomy sites (Fig. 6). A primary stability of 30 Ncm was achieved for both the implants when measured using a torque ratchet. Putty matrix was placed in the mouth to assess the exact location of implants, after implants placements (Fig. 7)

An immediate loading protocol was followed, as the desired primary stability was achieved for both the implants. Female housing with O-ring matrices were then snapped into place on the ball abutments (Fig. 8) and no block out is needed in this implant system as already there was plastic red color ring which act as a block out material. The space for the housing was then created on the final mandibular denture by relieving it from inside (Fig. 9) and a direct pick-up was made using auto polymerizing acrylic resin. Denture was then checked for retention and occlusion and the patient was instructed not to remove the denture for the next 7 days (Fig. 10). Postoperative instructions were given such as mouth rinsing with 0.12% chlorhexidine gluconate solution and to complete the prescribed doses of antibiotics and analgesics. Seven days later, he was reviewed and found that healing was satisfactory. The patient was trained to use the denture.

II. Discussion

Flapless implant surgery for edentulous has gained popularity in recent year⁷. An obvious advantage of this technique is the elimination of the need to surgically raise a flap and expose underlying bone to place implants. This has been reported to increase the patients comfort and acceptance, and to minimize the loss of soft tissue that heals faster with minimal complication. A high rate of success was observed by Cooper et al⁹. Studies have shown that implant supported mandibular overdenture have better retention when compared to conventional complete dentures regardless of the attachment system used – ball, magnet or bar^{7,8}. Better functional efficiency, comfort and speech are unique characteristics of an overdenture, which make them superior to conventional complete dentures. Implant supported Overdenture also reduce the tissue coverage and extension of the complete dentures which is especially important for patients with low gagging threshold. Even though more number of implants provides more reliability for the prosthesis, the success rate of two implants in the anterior mandible for retention of overdenture is highly successful⁹. Studies revealed that failure to achieve parallelism between the two implants will lead to deleterious forces on the implant head which will finally result in higher maintenance needs for the unsplinted overdenture patients. Thus mutual parallelism between the two implants is of paramount importance from a prosthetic perspective as it determines the long term survival of the implants¹⁰. The O-rings used for enhancing retention has a number of advantages, such as ease of use, low cost, maintenance and elimination of superstructure. But the O-rings will gradually wear over time, thus compromising retention, requiring their periodic replacement¹³.

In this case report complete denture was fabricated prior to surgical procedure; hence the implant placement was prosthetically driven. Here the final implant position was determined by a balance between final tooth positions via surgical guide and the available bone⁴.

III. Conclusion

Rehabilitation modality using mandibular overdenture is a simple, predictable and acceptable treatment option and it has emerged as a superior treatment modality over conventional removable complete dentures. The procedure is cost effective as well as less invasive when compared to fixed implant dental prostheses. This case report describes the use of two immediately loaded single piece implants with ball abutments to retain a mandibular overdenture in a completely edentulous patient. Since the denture fabrication was done prior to surgical placement of implants, these implants were prosthetically driven. A simple and predictable one stage

surgical protocol, followed by immediate loading can be considered as the technique of choice for placement of implants where there is adequate bone quality and quantity.



Fig. 1. Preoperative OPG



Fig. 2. Denture trial



Fig.3 Putty matrix was cut

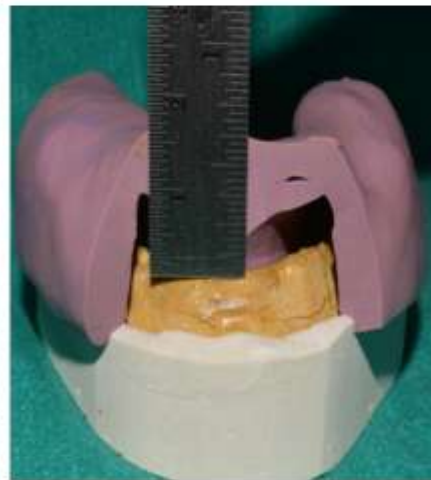


Fig. 4. Measurement of restorative space



Fig 5. Implant angulation



Fig. 6. Implants placement



Fig. 7. O-ring attachments



Fig. 8. Putty matrix placed after implants placements



Fig. 9. Preparation of denture



Fig. 10. Intaglio surface witho-ring attachments



Fig.11. post insertion after implants placements



Fig. 12. Post Insertion Opg



Fig. 13. Review after two months

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