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RESEARCH ARTICLE

THE EDENTULOUS MANDIBLE: AN ORGANISED APPROACH TO TWO IMPLANT OVERDENTURES

^{1,*}Dr. Nayar Islam, ²Dr. Nilishashukla, ³Dr. Aryn Chamadia and ⁴Dr. Sanket Deolkar

¹Post Graduate student, Department of Prosthodontics, Saraswati Dental College, India

²Post Graduate student, Department of Prosthodontics, Saraswati Dental College, Lucknow, India

³Post Graduate student, Department of Prosthodontics, Babu Banarasi Das Dental College, Lucknow, India

⁴Post Graduate student, Department of Prosthodontics, Pacific Dental College, Udaipur, India

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ABSTRACT

The Complete edentulous population comprises more than 10% of the adult population, a vast majority of these patients are treated with complete dentures. However, most patients find it difficult to adapt to mandibular denture due to lack of retention and stability. Recent scientific studies carried out over the past decade have determined that the mandibular implant supported over denture as the treatment of choice in the edentulous patient regardless of the most clinical situations and has become the minimum standard of care for most completely edentulous mandibles.

Key Words:

Bone Mineral density,

Cone beam computed tomography,

Orthopantomograph with ball bearings.

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INTRODUCTION

Overdenture treatment is a notion which precludes the inevitability of the "floating plastic" in the edentulous mouths. An implant-retained overdenture is a removable dental prosthesis that is supported by the residual oral tissues and employs dental implants for retention. Implant-retained overdentures are a treatment alternative for many patients for whom conventional dentures are poorly tolerated. They may be indicated in patients with changed anatomy, neuromuscular disorders, significant gag reflexes, or considerable ridge resorption. The concept of overdentures is age old. Ledger as early as 1856, suggested utilizing natural teeth to stabilize removable prostheses and after a whole century Miller introduced the concept of tooth retained overdentures (Miller, 1965). The disadvantage of these prostheses was the frequent failure of abutments caused by periodontal disease, periapical lesions, caries and fracture of teeth (Fenlon, 2005). The introduction of osseointegrated implants and implant-retained prostheses led to a paradigm shift for the management of edentulism.

***Corresponding author: Dr. Nayar Islam,**

Post Graduate student, Department of Prosthodontics, Saraswati Dental College, India.

This is true especially for mandibular edentulism, where the problem of advanced alveolar resorption and difficulty in providing stable, retentive and functionally comfortable prostheses seemed to represent a major challenge (Feine, 2002). Several advantages with an implant-supported overdenture prosthesis includes reduced anterior bone loss, improved esthetics, improved stability, improved occlusion, decrease in soft tissue abrasions, improved speech and improved chewing efficiency (Awad, 2003; Thomason, 2003; Naert, 2004). In a randomized clinical report, Awad et al compared satisfaction and function in complete denture patients versus patients with implant supported overdenture, showing a significantly higher satisfaction, comfort and stability in the overdenture group (Awad, 2003). An implant supported overdenture also provide some advantages over the implant-supported complete fixed partial denture including a fewer requirement of implant number because soft tissues may provide additional support. As the soft tissues may share a portion of the occlusal load, less bone grafting and number of implants, the cost of the treatment is dramatically reduced. Hygiene conditions are also improved with an overdenture compared with a fixed prosthesis. The ultimate goal is to design a prosthesis that is completely supported, retained with no difficulty in chewing/speech and if the edentulous patient is willing to remain with a removable prosthesis, an overdenture is often the treatment of choice. The present case reports a patient with prosthodontic rehabilitation consisting of mandibular implant supported overdentures.

CASE REPORT

A 50 year old male patient reported to the Department of Prosthodontics Crown and Bridge with a chief complaint of an ill-fitting, lower complete denture that he had been wearing for four years.

The clinical and radiographic findings revealed slight to moderate mandibular ridge resorption with an ill-fitting lower denture. The resorption in the mandibular arch was classified as Atwood's order V. He suffered with no apparent medical illness. Advantages and disadvantages of different treatment options were discussed and patient was convinced for an O-ring ball attachment-supported mandibular overdenture.



Figure 2. Final Impressions



Figure 1a. Completely edentulous mandibular arch



Figure 3. Denture duplication

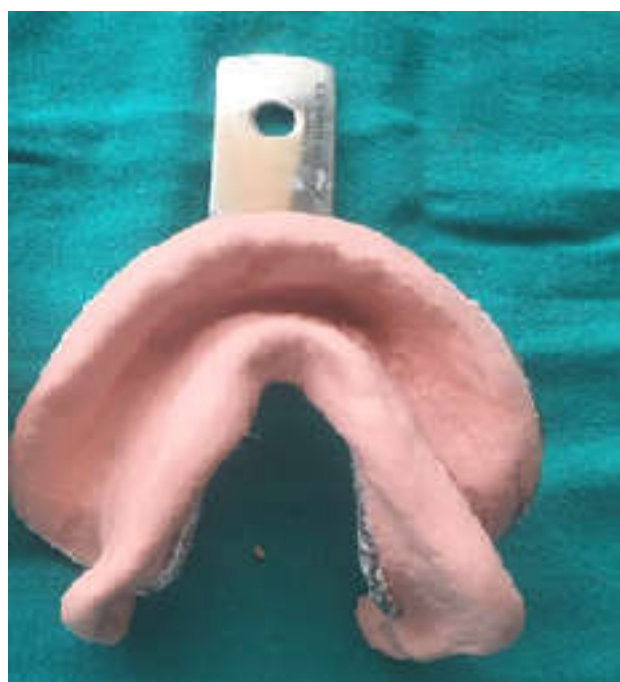


Figure 1b. Mandibular primary impression



Figure 4. Implant insertion



Figure 5. Orthopantomograph post implant Insertion



Figure 6. Ball attachment in place



Figure 7a. Complete denture



Figure 7b. Rehabilitation with implant supported mandibular overdenture

Investigations

- Bone Mineral density.
- Cone beam computed tomography.
- Orthopantomograph with ball bearings.
- Bleeding/Clotting time.
- Blood glucose (Fasting and Post-Prandial).

Prosthesis fabrication: Maxillary and mandibular preliminary impressions were made in Alginate. (Figure 1)

- Autopolymerising acrylic resin was used to fabricate custom trays. Conventional technique of border moulding and secondary impression were performed for the maxillary arch. Custom tray for the mandibular arch, however, was made using cock-tail impression technique.

The final impression for maxillary arch was made using Zinc oxide eugenol impression paste following the incremental method of border moulding with green stick compound. (Figure 2)

- Facebow transfer, Vertical and Horizontal Jaw relation, articulation, teeth arrangement and try in were done.

Implant surgery

A diagnostic OPG was taken after placement of a radiographic stent with two ball bearings followed by bone mapping procedure for the assessment of dimensions of available bone at the proposed site of implant placement. Potential implant site for overdenture support in anterior mandible between the mental foramina (B and D positions independent of each other) were selected. Duplicate denture was used to mark these positions intraorally (Figure 3) Prophylactic dose of 1000mg amoxicillin was given to the patient before commencing the surgery.

At the surgical appointment, following the administration of local anaesthetic, a mid-crestal incision was performed and a full-thickness flap was reflected. In addition, osteotomies were prepared in type II bone. Bone taps were used to countersink the sites, after which two implants 3.5mm × 11.5 mm were placed (Figure 4) The implants were torque to 35 N. Interrupted suturing was done using silk 3-0 sutures for primary closure of the line of incision. Post implant placement OPG was taken. (Figure 5) The patient was then discharged with a prescription of the following:

- Tab. Amoxi-Clav 500mg three times daily for five days.
- Tab. Ibuprofen 400mg three times daily for five days.

Second stage surgery was performed 3 months postoperative and prefabricated gingival formers were attached and an OPG was taken to check the fit of gingival formers, which were subsequently replaced after formation of gingival cuffs with metallic ball abutments.

Locator attachment system was used to connect non-splinted implants with mandibular overdenture (Figure 6). The abutment site was marked intraorally with an inedible pencil and these markings were transferred to the lower denture.

The denture was relieved in the marked area and direct method of attachment of nylon plastic cap with lower denture was used. Home care instructions were discussed with the patient during the placement visit and patient was recalled after 1 week for a follow up. At the 1 week follow up the patient expressed his satisfaction with the new denture in terms of its stability and retention. Further recalls at two months and six months showed no complications and the patient reported to be satisfied with the prosthetic rehabilitation (Figure 7)

DISCUSSION

Implant overdentures borrow several principles from tooth-supported overdentures. The advantages of implant overdentures relate to the ability to place rigid, healthy abutments in the positions of choice. Anterior alveolar ridge resorbs slower than posterior. So, in anterior region, ridge height is high and there is absence of any limiting structure. After first premolar mental foramen is present, from where mental nerve passes. Two implants were placed in canine region in this case. Positioning of the implants in canine region is better than positioning of implants in premolar region as independent implants in the premolar region allow greater amplitude of rocking of the restoration compared with implants in canine regions.

It reduces the anterior movement of the prosthesis and also the prosthesis even may act as a splint for the two implants, thereby reducing stress on each implant (Meijer, 2009; Meijer, 2003; Meijer, 1992). In this report, ball attachment was used because, it is reported that ball attachment are less costly, less technique sensitive, and easier to clean than bars and less wear or fracture of the component than that of gold alloy bars. Moreover, the potential for mucosal hyperplasia reportedly is reduced with ball attachments. It was also reported that the use of the ball attachment may be advantageous for implant-supported overdentures with regard to optimizing stress and minimizing denture movement (Gallucci et al., 2009).

The ball attachment used was connected to the overdenture using the direct pick-up procedure instead of the indirect technique for its superior long-term prosthetic aftercare, to curtail the errors in clinical impression and laboratory techniques (Nissan, 2011). An implant supported overdenture exceeds conventional complete denture at various fronts viz. retention, stability, chewing efficiency and phonation (Mancuso, 2008). The oral health related quality of life assessment shows a consistently better patient satisfaction and acceptance than with conventional dentures.

Conclusion

Two-implants supporting a locator retained mandibular overdenture seems to be a suitable treatment option. It is a simple, cost effective and minimally cumbersome option for rehabilitation for such patients. Implant dentures provide the benefits of improved esthetics, phonetics, bone preservation, comfort, all resulting in an improved quality of life for the patient.

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