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Prosthetic Rehabilitation of the Edentulous Mandible with two-Implants Retained Overdenture Using Ball Attachments: A Case Report

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Abstract

Edentulous patients have been treated with conventional complete maxillary and mandibular dentures as a primary treatment modality. Suitable complete maxillary dentures are usually well tolerated but many patients struggle to chew and swallow with the complete mandibular denture because it is too unstable. Previous studies have shown that a mandibular two-implant retained overdenture is superior to conventional denture in terms of retention and stability. Thereby, the two-implant assisted mandibular overdenture should be the first treatment option for mandibular edentulous patients. In this report, a mandibular two-implant retained overdenture with ball attachments using direct intraoral pick-up technique is discussed.

Keywords: Implant Overdenture; Edentulous Mandible; Ball Attachment; Healing Abutment

Introduction

Rehabilitation with conventional maxillary and mandibular dentures has been well accepted by most of the patients. However, some patients find dentures problematic due to inadequate stability and retention. Based on the literature review, mandibular two implant retained overdentures are considered better option compared to the conventional mandibular complete dentures [1]. Reford et al. [2] found 50 % patients with mandibular denture having problems in stability and retention [2]. Conventional dentures rely upon the residual alveolar ridge and mucosa for support and retention. In this regard, rehabilitation by means of implants offers a significant improvement over conventional prostheses, improving phonetics, esthetics, patient satisfaction and quality of life [3]. Implant retained overdentures result in decreased bone resorption, reduced prosthesis movement, better esthetics, and improved tooth position, better occlusion, including improved occlusal load direction, increased occlusal function and maintenance of the occlusal vertical dimension. Studies also proved that patients wearing implant-supported overdentures exhibit superior results compared to conventional dentures [4] and enjoy a significantly higher quality of life compared to conventional denture wearers [5]. The two-implant retained overdenture, thus, should be the first treatment choice for mandibular edentulous patients [5,6]. In this case, we delivered a mandibular implant-retained overdenture with ball attachments by using intraoral pick-up technique.

Case Report

A 55-year-old female patient reported to the Department of Prosthodontics, CODS, and BPKIHS with the chief complaint of loose lower complete denture prosthesis. She had been using the current set of dentures for the past 6 months and had difficulty in eating and speaking properly as the lower denture was ill fitting. She gave a history of losing her teeth 5 years back due to caries and periodontal disease. Extra oral examination revealed class III facial profile and a prognathic jaw relationship according to Angle's classification. Intraoral examination revealed U shaped ridges which were smooth without any irregularities, bony spicules or root pieces. The maxillary ridge was favorable for conventional denture construction, but the mandibular ridge was found to be resorbed (Atwood's class IV) (Figure1). The diagnostic casts were made; a panoramic radiograph (Figure 2) was taken to assess the bone for suitable selection of implants. Radiographic examination of the patient showed that the patient had dense compact bone in the mandibular anterior region without any pathological findings (Figure 3). The treatment plan of maxillary conventional complete denture with mandibular

two-implant retained overdenture was explained to the patient. The patient was convinced and hence, accepted the new treatment plan.

Figure 1: Mandibular ridge

Figure 2: Final panoramic radiograph.

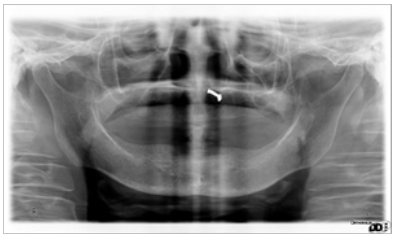

Figure 3: Pre-treatment panoramic radiograph

Chair-side tissue conditioner (Lynal®, Dentsply Caulk, U.S.A.) and Unifast® self cured resin occlusal reline were performed to improve the tissue adaptation and the occlusion of the old dentures. The relined mandibular denture was duplicated to make a surgical stent for one stage implant placement. In stage one surgery two implants (3.5 × 11.5) (Adin Dental Implant System Ltd; Afula, Israel) were placed in the anterior mandible at B and D region (Figure 4). Sutures were placed and the patient was recalled after one week. After one week sutures were removed and the existing mandibular denture was delivered as a temporary prosthesis during the healing phase.

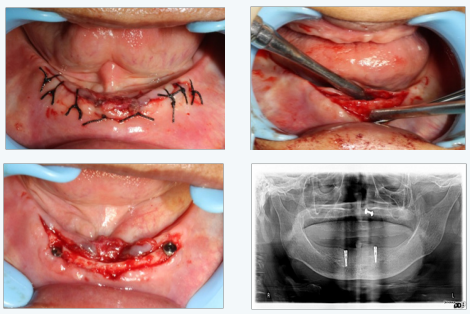

Figure 4: Stage I surgery

A second stage surgery was carried out to place healing abutments 3 months after the primary implant surgery. Healing abutments were fastened to the implants to allow soft tissue healing without any disturbance. After 1-week ball attachments were attached with the implants (Figure 5).

Figure 5: Intraoral view of ball attachment to the implants

Impression of the mandibular arch with ball attachment was made using closed technique and poured with dental stone (Kalstone, Kalabhai Karson Pvt. Ltd, India).The attachments were placed and O rings were blocked-out on the abutments. The intaglio surface of the mandibular denture was relieved to provide space for the o-ring attachments. Pressure indicating paste (Mizzy Prestige Dental Products) was used to verify the absence of contact of the denture base with abutment or attachment. A standard chair side auto polymerizing resin mix was then prepared and placed into the denture. Denture was placed and the patient was asked to close in function over the implants with the o-rings attached. Denture was removed from the patient's mouth just before final set. The excess acrylic material was removed and the denture was replaced back to final set. Insertion of final denture was done (Figure 6).The patient was instructed with the insertion and maintenance of the dentures after occlusal adjustment and the verification of soft tissue adaptation. The patient was trained to use the new set of dentures, and was satisfied with good stability and greater degree of retention of them mandibular denture in comparison to the previous one.

Figure 6: Final denture in situ

Discussion

The treatment involving two independent implants without rigid interconnection is an important consideration with regard to the mandibular overdenture treatment. When using implant in position B and D, the anterior movement of the prosthesis is markedly reduced and the prosthesis may also act as a splint for the two implants during anterior biting forces. There is some degree of stress reduction in each implant due to this factor. Factors like the psychological feeling of a removable appliance, the need for frequent attachment change, the need for relining and prosthesis movement come to play while putting the disadvantages into consideration .

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OD 1 is used as a treatment option, when patients understand that additional implant support is beneficial but financial constraints require a transition period of few years before placing additional implants. It is reported that ball attachment are less costly, less technique sensitive [7], and easier to clean than bars [8] and less wear or fracture of the component takes place than gold alloy bars [9]. Moreover, the potential for mucosal hyperplasia is significantly reduced with ball attachments [10]. 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 [11]. The approach of using ball attachments with healing abutments as supporting structure in this report has an advantage of being incorporated at the chair side.

Previous series studies conducted by McGill University revealed that the implant retained mandibular overdenture is superior to conventional denture not only in overall satisfaction, chewing satisfaction, nutritional status, eating and social activity, but also easier to fabricate. Moreover, the implant retained mandibular overdenture is a cost-effective intervention. In consistency with the McGill group, we have similar improvement in patient outcomes and ease in the fabrication procedures.

Conclusion

The standard treatment of the edentulous patient has no doubt for many years, been a conventional Complete Denture. Many CD wearers have significant problems in adapting to their mandibular prosthesis compared to the maxillary one. As presented in the clinical report, the patient benefited tremendously from the mandibular implant-retained overdenture. The greater degree of patient satisfaction has also been taken into account and the fabrication procedure being easier is a major advantage in this treatment option. Therefore, the two implant-retained overdentures should be considered as the first treatment option for mandibular edentulous patients.

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