

Rehabilitation of an Edentulous Patient with a Mandibular Implant Supported Over Denture: A Case Report.

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Research Article

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ABSTRACT

Replacement of missing teeth has become a successful option ever since the discovery of Osseointegration and introduction of implants in the dental field. It has proved to be a therapeutic breakthrough especially for edentulous people. Implants supported over dentures are becoming the first choice of treatment for edentulous patients as they provide various advantages over the conventional dentures most importantly enhancing the denture retention and stability. This article discusses the rehabilitation of a completely edentulous patient with a mandibular implant supported over denture which drastically improved the oral health related quality of life of the patient.

INTRODUCTION

A severely resorbed mandible poses a true challenge to the clinician while fabricating complete dentures. Tooth extraction is followed by a loss of bone width by 25% and a loss in bone height of 4 mm during the first year [1]. With removable denture wearers, bone loss continues over the years. The absence of the alveolar ridge compromises the retention and stability of the dentures. Implants supported over dentures have proven to be a viable option to treat such patients. Implants not only provide continuous stimulation to the bone, leading to minimal bone loss, they also improve the overall retention and stability of the prosthesis. Implants supported over dentures are predictably and significantly better than conventional complete dentures [2,3].

There is a high success rate of mandibular implant supported over dentures [4]. Van Steenberg et al has Mericske Stern et al and Jemt et al reported success rates 98%, 97% and 100% respectively [5].

Anterior mandibular region, between the mental foramina, presents with optimal bone density and available bone, which are ideal for implant placement. Misch [6] has classified the over denture designs based on various positions from first premolar to premolar. (Table 1)

Several attachment systems are available, such as ball attachments, bars, clips, and o-ring attachments and magnets. The attachments are selected based on the type of prosthetic movement encountered. The various movements possible have also been reported by Carl E Misch [6]. (Table 2)

Case report

A 43 year old female presented with the complaint of difficulty in masticating and wanted replacement of her existing dentures. She requested for any options other than the conventional dentures which she was wearing for the past one year and found them dissatisfactory.

The patient's dental history revealed extraction of all remaining teeth due to advanced periodontal disease one year prior to presentation and had been wearing a full maxillary removable prosthesis. The patient reported that she could never adjust to the mandibular denture as it was loose and uncomfortable during chewing. The mandibular denture fractured a month ago and she discarded the same. On examination the mandibular ridge revealed severe resorption. (Figure 1) Maxillary denture was found to be satisfactory. A panoramic radiograph and a spiral CT was taken to evaluate the available bone for implant placement. A radiographic stent using metal ball

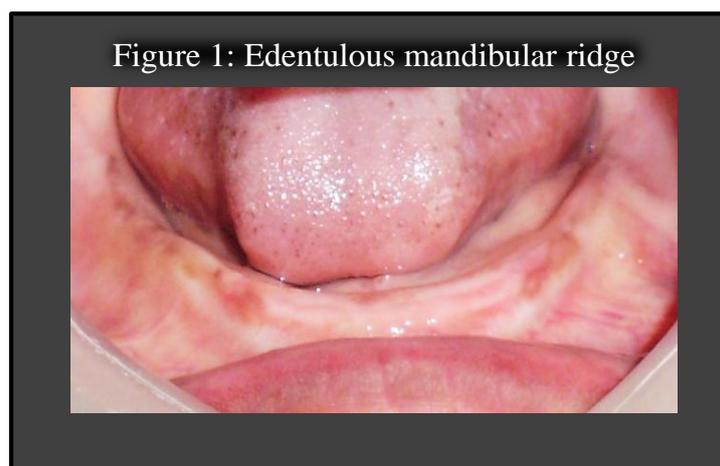
bearings was made to aid in the radiographic assesment of the bone. A temporary mandibular denture base with occlusal rims was fabricated and the vertical dimension was determined, so that a decision regarding the attachements can be made.

OPTION	DESCRIPTION	RP5
OD-1	Implant in B and D positions independent of each other	Retention only PM6 Type of attachment O-ring
OD-2	Implant in B and D positions joined by a bar without distal cantilever	Retention and minor stability PM-3 to PM-6
OD-3A	Implant in A, C and E positions rigidly joined by a bar when posterior ridge form is good	Retention and moderate stability PM-2 to PM-6 (two legged chair)
OD-3B	Implants in B , C and D positions joined by a rigid bar when posterior ridge form is poor	Retention and minor stability PM-3 to PM-6
OD- 4	Implants in A, B , D, E positions joined by a bar cantilevered distally about 10mm	Retention and moderate stability PM-2 to PM-6 (three legged chair)
OD-5	Implants in A, B , C, D positions joined by a bar cantilevered distally about 15mm	Retention , stability and support is high PM-0 (four legged chair)

Table 1

Type of Prosthetic movement	Description of movement
PM-0	Prosthesis does not move during function. Implant support similar to fixed prosthesis
PM-2	Prosthesis having hinge movement (in two planes)
PM-3	Prosthesis having apical and hinge movement
PM-4	Prosthesis having movement in four directions
PM-6	Prosthesis having all ranges of movement

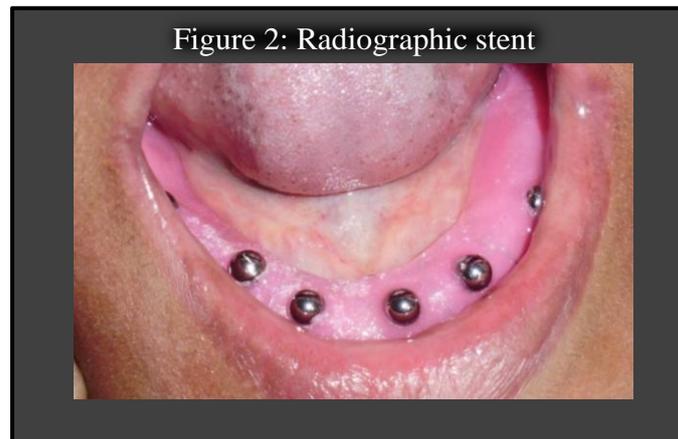
Table 2



Radiographic stent fabrication

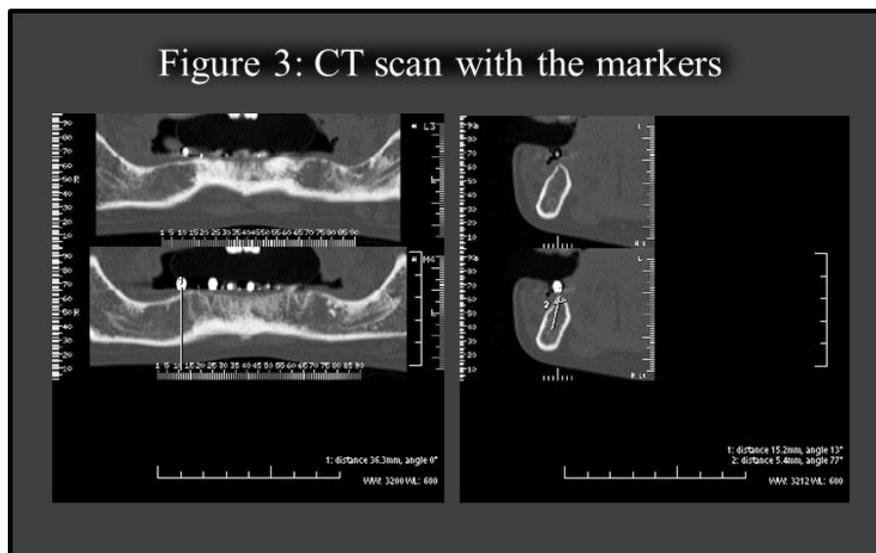
The ideal positions A, B, C, D, E as described by Carl Misch were marked on the diagnostic cast. The temporary denture base used for recording the vertical dimension tentatively was converted into a radiographic stent. After the vertical dimension was determined, wax was removed from the temporary denture base and the

ball bearings were attached to it, exactly on the positions marked on the cast. The stent was worn by the patient during CT scan. (Figure 2)



Denta scan evaluation

The denta scan revealed the available bone height and width corresponding to the areas where the metal ball bearing was attached. Based on the scan measurements, a decision of placing 4 implants in the positions A, C, D, E was made. (Figure 3)



Surgical phase

At the surgical appointment following administration of local anesthetic, a crestal incision was made from the first molar to the first molar on the mandible keeping the midline tissue intact.(Figure 4) The ball bearings corresponding to the selected sites were removed and the radiographic stent was converted into a surgical stent. (Figure 5) Osteotomy site preparation was performed and four implant fixtures with a diameter of 3.5 and length of 11.2mm were placed in the predetermined positions using the surgical stent as a guide for the positions. (Figure 6,7,8) Cover screws were placed and the incision closed with 4-0 PGA sutures in a simple interrupted fashion. New set of complete dentures were fabricated for the patient during the healing phase. The new mandibular denture was stable, however retention was compromised. The tissue surface of the denture was relieved corresponding to the implant sites to avoid any impingement leading to a disturbance in osseointegration.

Figure 4: Incision, keeping the
midline tissue intact

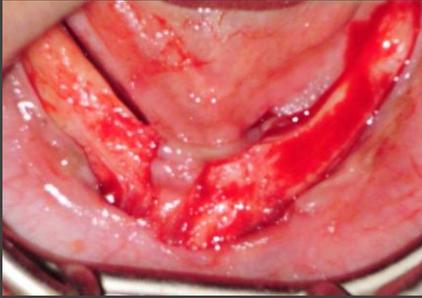


Figure 5: Radiographic stent converted into a
surgical stent



Figure 6: Osteotomy site preparation
using surgical stent as a guide



Figure 7: Paralleling pins placed
in the osteotomy sites



Figure 8: Cover screws in position



Following four months of healing to allow integration of the implant fixtures a panoramic radiograph was taken to verify bone levels around the fixtures. An incision was made at the crest over each fixture and the cover screw removed. "Ball" attachment heads were placed into each fixture and torqued to 25 Ncm as per the manufacturer.(Figure 9)

Figure 9: Ball attachments in position



Holes were punched in a piece of rubberdam and slipped over the “ball” heads and the female portion of the attachment (rubber ring) in a metal housing was placed on each implant attachment. The dentures were relieved over the attachments to allow passive seating of the denture without contact on the metal housing but full contact with the ridge circumferentially. The metal housings were picked up utilizing denture repair methyl methacrylate resin mixed from powder/liquid to a doughy consistency and inserted into the receiving wells in the dentures. The dentures were inserted and the patient guided into occlusion and instructed to lightly occlude. Following setting of the resin the dentures were removed and excess resin was trimmed with an acrylic bur and polished. There was marked improvement in the retention and stability of the dentures. After 3 months follow up patient reported that the denture was comfortable and helped her to drastically improve her masticating ability. (Figure 10)



CONCLUSION

The mandibular overdentures retained by four ball attachments supported by four endosseous implants improved the retention, stability and thereby the masticatory efficiency and the overall oral health related quality of life of the patient.

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