



## A NOVEL APPROACH OF FULL MOUTH REHABILITATION WITH MAXILLARY IMPLANT SUPPORTED BALL RETAINED OVERDENTURE AND MANDIBULAR POST RETAINED TOOTH SUPPORTED OVERDENTURE: A CASE REPORT

### Dental Science

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### ABSTRACT

Preservation of teeth for overdenture can improve retention and stability and incorporation of attachment increases retention of the denture. In this case report, completely edentulous resorbed maxillary arch was restored with implant supported overdenture using ball attachment. Mandibular arch was restored with access post system retained tooth supported overdenture. In this case report an "Access post overdenture system" was used which is more advantageous over the conventional tooth supported overdentures. The access post overdenture fabricated was well retentive and esthetic serving as a conservative approach for root preservation.

### KEYWORDS

Implant Overdenture, Access Post, Tooth Supported Overdenture

### INTRODUCTION

With today's high life expectancy and continuous population growth, the amount of elderly patients visiting the dental practice is increasing. For a proper treatment of these individuals, medical, social, and dental factors have to be considered. The incidence of edentulous patients varies worldwide between 7% and 69% (Petersen et al. 2005).<sup>1</sup> Patients seek tooth replacement to address issues related to comfort, function, or esthetics. As patients experience the loss of teeth the dentist's ability to provide restorations that meet their desires diminish. In response to this situation dentists have diligently sought to establish new approaches to address the edentulous or partially edentulous condition.<sup>2</sup>

The introduction of implants to retain dentures was a huge improvement for those patients and offered new treatment alternatives. Different aspects, such as psychological factors, mastication, stability, comfort, speech, food choice and impact on social activities could be optimized.<sup>1</sup> Patients with conventional maxillary dentures may seek implant treatment to obtain a higher degree of prosthesis retention and comfort. Maxillary implant overdentures pose advantage over conventional denture for patients with poor bone quality, severely resorbed maxillae, and also limited number of implants are required to support a fixed prosthesis. Moreover, overdentures are useful with high lip-line, unsupported lips, need of facial support, and buccal inclined ridges. There is a consensus in the literature that a minimum of four implants is recommended to support maxillary overdentures.<sup>3</sup>

In most studies reporting on maxillary implant supported overdentures, the implants were located in the anterior maxillary region. However, implants placed in anterior maxillary regions for overdenture anchorage showed failure rates that often correlated with anterior maxillary bone quality and bone volume and with implant characteristics, especially implant length and diameter. Numerous investigations of the maxillary posterior region after sinus augmentation procedures have shown high success rates for dental implants placed in augmented maxillary posterior regions, even for the support of maxillary overdentures. Thus, implant placement in the posterior maxilla for overdenture anchorage may be an alternative to treatment with implants placed in the maxillary anterior region.<sup>4</sup>

The most significant advantage of a tooth supported overdenture is bone maintenance because the maintenance of bone volume and vertical height can produce increased prosthetic retention and stability. It also gives patient better function and control because of intact proprioception.<sup>5</sup> The aim of the present clinical report is to describe a treatment protocol for the full mouth rehabilitation where maxillary arch was restored with four implant supported overdenture and partially edentulous mandibular arch restored with tooth supported overdenture using access post system.

### CLINICAL REPORT

A 56 year old female patient presented to the outpatient Department, Department of Prosthodontics with a chief complaint of multiple missing teeth and mobile teeth. On intra-oral examination, it was found that maxillary arch was resorbed, completely edentulous. Mandibular arch was partially edentulous and remaining dentition was periodontally compromised (Fig 1). Teeth present in mandibular arch were first premolar on left side to canine on right side, right second premolar and right third molar. The prognosis of right and left central, lateral incisor and right third molar was poor due to bone loss and furcation involvement (Fig 2). Extraction was advised for these teeth for further treatment planning. On history taking, no systemic disease was evident. Treatment options available for the patient were either removable denture, implant supported fixed denture or implant retained overdenture and tooth supported overdenture. After taking patient consent, treatment option decided was ball attachment retained maxillary implant overdenture and access post system retained mandibular tooth supported overdenture.

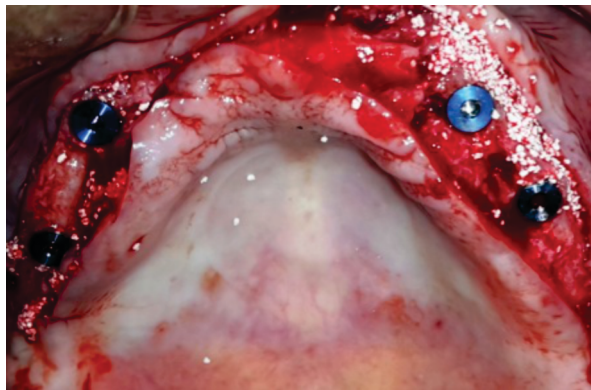


Fig 1. Initial panoramic radiograph

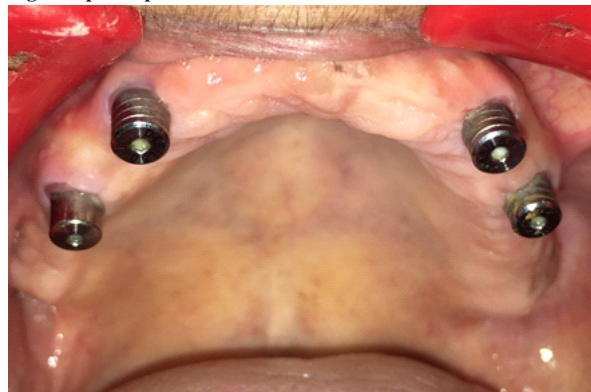


Fig.2. Preoperative Intraoral view

For maxillary arch rehabilitation, computed tomography (CT) scan was obtained to select the implant sizes and plan an implant-supported overdenture for maxilla. Complete denture was fabricated and interocclusal space was determined for attachment selection. Interocclusal distance was limited so ball attachments were decided for the patient. Complete denture was duplicated to use as a surgical stent in clear acrylic resin (DPI, Heat cure). The patient was premedicated with Cap amoxicillin 500 mg, Tab seradic-P thrice a day and instructed to rinse twice daily with chlorhexidine (0.1%) one day before surgery. The surgical procedure was performed under local anaesthesia with Articaine (4%) with epinephrine (1:100 000). A full-thickness incision extending approximately between the first molar regions was made, and a mucoperiosteal flap was reflected. The implant sites were prepared using surgical stent as mandated by the implant system at 900 rpm with a 20:1 handpiece and a surgical micromotor. Four conical implants (Alpha-Bio Tec; 3.75 mm diameter, 11.5 mm in length) were inserted with a handpiece at an initial torque of 35 Ncm (Fig 3) and the flap was then sutured. The patient continued to use a complete removable dental prosthesis with a temporary soft liner (Viscogel, Dentsply) until loading. Conventional loading protocol was followed and gingival healing screws were placed three months after the implant placement (Fig 4). After 10 days, healing abutments were replaced by the ball abutments (Fig 5). Nylon caps were picked up in autopolymerizing resin in maxillary denture.



**Fig. 3 Implants placement done**



**Fig 4. healing abutment placed**



**Fig. 5 Ball abutments placed**

For mandibular rehabilitation, intentional endodontic therapy was planned for right and left canine, left first premolar and right second premolar. Right and left canine were prepared to receive access post system according to guidelines for post space preparation. Left first premolar and right second premolar were prepared and left submerged in bone for preservation of the alveolar bone. Access posts were cemented in the prepared right and left canine with resin cement (Fig 6). Metal housing and nylon caps were placed over access post ball abutment and pick up was done with direct technique using self polymerising acrylic resin (DPI,India) (Fig 7). Finishing and polishing of final denture was done and the definitive prosthesis was delivered to the patient after occlusal adjustments and maintenance instructions were given to patient (Fig 8).



**Fig 6. Ball attachments of access post system**

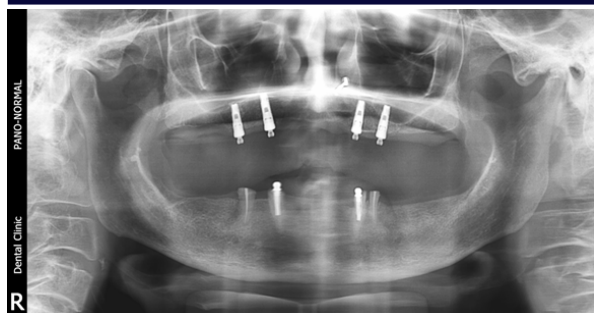


**Fig 7. Intaglio surface (metal housing incorporated in the prosthesis)**



**Fig 8. Definitive prosthesis intraorally**

Because of the dental history of the patient, follow-up visits were scheduled every three months. During these visits, probing and clinical evaluations revealed no signs of peri-implant disease. Orthopantomogram was obtained after six months to confirm the maintenance of the bone levels (Fig 9). The patient was satisfied with the function, esthetics, and retention of the restoration.



**Fig 9. Final orthopantomogram.**

## DISCUSSION

Significant improved retention and stability was found in implant or tooth supported overdenture in comparison to conventional complete denture. The rehabilitation of an edentulous maxilla with dental implants is a challenging treatment, especially when the jaws are severely atrophied. In addition to insufficient bone volume for implant placement, unfavourable intermaxillary relationships and the association of these conditions can result in difficulties in rehabilitation.<sup>6</sup>

In this clinical treatment, the patient was informed regarding the treatment options and fixed prosthetic option was declined due to less bone volume in posterior maxilla. Because the favourable bone volume was present in premaxilla and middle portion of the maxilla therefore placement of the four implants was proposed for overdenture to avoid more extensive procedure like direct sinus lift.

A labial flange was required to compensate for the resorptive process of the maxilla to provide adequate support for the lip and to improve the patient's phonetics and facial profile. For patients with extensive residual ridge resorption, the replacement of hard and soft tissues with a removable prosthesis might be considered a more suitable option than a cemented or screw-retained restoration. Another characteristic of removable implant supported dentures that distinguishes them from fixed prostheses is retrievability, which allows for simple repairs and modifications of the acrylic resin dentures and easy access for peri-implant hygiene.<sup>7</sup>

When providing a four implant retained maxillary overdenture various attachment types are available: splinting the implant by means of a bar construction or loading them separately through ball attachment, telescopic crown attachments, magnets etc. In this case the ball attachments were used, which provides better retention hence increasing the comfort and functional ease and also economical.

To support a maxillary implant-supported overdenture the number of implants varies from 2 to 8. Overdentures using a bar/clip attachment have demonstrated good functional results in case of 4 or 6 implants. In this case of 4 implants and ball attachments, the implant survival rate was 95.2% per year. For 2 implants, the cumulative implant survival rates in the maxilla after 7 years of loading were 75.4%, whereas there were no differences in implant survival rates between the bar and ball attachment systems.<sup>8</sup> In the present clinical case, the use of 4 implants was enough to provide retention and stability to the prosthesis.

When some clinicians feel that splinting implants with a bar provide additional stability, a study comparing retention by straight bar with clip, magnet and ball attachments found no difference in success rates, marginal bone height, periodontal probing level or patient satisfaction in three groups of overdenture attachments.<sup>9</sup>

The basic overdenture concept requires preservation of residual hard and soft tissues. It was concluded in a 5-year study that retention of mandibular canines for overdentures led to preservation of alveolar bone.<sup>5</sup> Tooth-borne overdenture attachment therapy is a treatment option rarely chosen in today's aggressive marketing of implant treatment.

Access posts are stud attachments which are the simplest of all, and work well with overdentures. They occupy a small vertical space and the male units do not require parallelism on different roots. The ball and socket attachment of Access post facilitates the rotation of denture. Small head of the attachment limits the amount of material that has to

be removed from the denture. The nylon cap provides 3-5 pounds of retention. The technical work required is minimal and can be carried out at chairside, thus making it cost effective.<sup>5</sup>

## CONCLUSION

The presented treatment resulted in the prosthetic restoration of resorbed edentulous maxilla with implant supported overdenture and partially edentulous mandible with tooth supported overdenture using access post system with improved masticatory function, esthetics, and oral hygiene. Implant\tooth supported complete dentures are a reliable option that is associated with good stability and retention.

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