

## Case Report

# Role of small diameter implants in prosthetic treatment

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After years of edentulism, the bone volume gets reduced significantly in width, length and height. So for placement of standard size implants, we have to perform augmentation of the edentulous site, which is time consume and relatively expensive. Hence in these cases we can opt for relatively smaller diameter implants  $\approx$ 2-3 mm. A 48 years old lady reported with complaint of poor esthetics due to missing upper front teeth. On examination, her upper central incisors were missing. Implant supported metal ceramic crowns splinted to each other were placed in this patient.

**Key words:** Atrophic ridge, dental endosseous implant, mini implant, small diameter

## INTRODUCTION

Removable and fixed partial dentures apply non-axial forces to abutments, cause relative ischemia of edentulous ridge due to pressure and lead to the loss of abutments due to caries and periodontal disease as compared to implant-supported prosthesis, which maintains the residual ridge height and abutment health.

Every edentulous site cannot be restored with the help of standard size implants and there are many case reports, which depicts the restoration of extremely atrophied ridges with the help of small diameter implants i.e., 2-3 mm, the drawbacks with these implants are that emergence profile is poor due to small diameter and if stressed too much they can undergo fatigue fracture.<sup>[1,2]</sup>

## CASE REPORT

A 48 years old female patient reported to the Department of Prosthodontics, IMS, BHU, Varanasi with chief complaints of poor looks and altered speech due to missing upper front teeth for last 3 years [Figure 1].

Clinical examination revealed that both maxillary central incisors were missing and edentulous ridge was well-moulded. On radiographic examination, no obvious pathology was found. Patient had no significant medical problem.

Patient was informed about all the treatment modalities available to solve her problem, each with its advantages and disadvantages and then we planned placement of two mini implants to support two metal ceramic crowns splinted with each other.

## Treatment procedure

Removable of partial denture was made to get the esthetics approved by the patient, which can later on act as a diagnostic stent, surgical stent and transitional prosthesis [Figure 2].

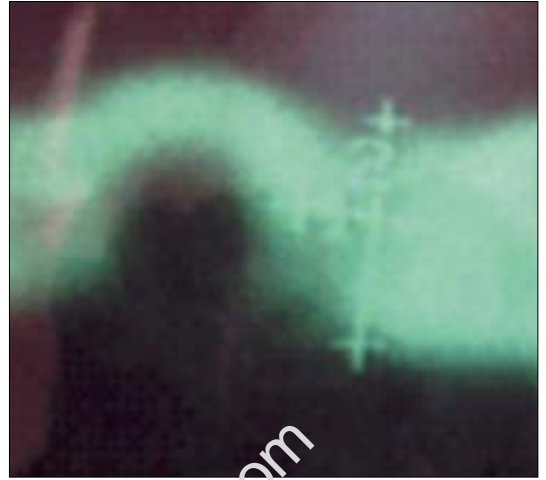
A total of 6.5 mm edentulous ridge width was available and soft tissue thickness of 1-2.0 mm was present. After bone mapping we found a width of approx. 4.5 mm.

On the tissue surface of the removable partial denture some material was deduced and BaSO<sub>4</sub> was placed to act as radiopaque marker for CT scan. Axial view depicts total labiolingual width 4.7 mm in crestal region and coronal view revealed height of 15 mm from alveolar crest to the nasal floor. So implants of 2.3 mm diameter, 14 mm in length were planned for this case [Figures 3 and 4].

The procedure was carried out under local infiltration anaesthesia. Flap was raised with #15C scalpel to minimal extent to keep periosteal blood supply intact. Osteotomy was started with 1.2 mm pilot drill to the required depth and then opened with 1.8 mm drill [Figure 5]. Parallelism was maintained with paralleling tool in first osteotomy when drilling second osteotomy [Figure 6]. External irrigation and intermittent drilling was performed to avoid unwanted heating of bone. Implants were inserted with the help of finger key avoiding excessive force to prevent micro-fractures of bone. Interrupted sutures were placed without tension for uneventful healing. Usual post-operative instructions were given and patient was recalled after 7 days. Sutures were removed and abutment part of implants was minimally altered with cooled diamond stones to achieve parallelism of the two implants [Figure 7].



**Figure 1:** Preoperative facial view



**Figure 4:** Axial view (CT Scan) - Showing width and length of available bone



**Figure 2:** Facial view with removable partial dentures



**Figure 5:** Osteotomy for central incisor being prepared



**Figure 3:** Coronal view (CT scan) - showing height of available bone



**Figure 6:** Depth gauge in place to check the osteotomy depth for central incisor and parallelism with lateral incisor

The transitional prosthesis with soft relining material was placed for 3 months.

During the fabrication of final prosthesis, the extra

layer of die spacer was placed to ensure the passive fit and the final prosthesis was cemented with the help of zinc phosphate cement. Prosthesis was relieved



**Figure 7:** Intra oral view showing implants after healing



**Figure 8:** Post-operative facial view

in centric occlusion so as to avoid the occlusal contact and reduce the force impact [Figures 8 and 9].

Patient was instructed to visit for regular checkup at 1, 3 and 6 months in the first year and every 6 months later on. The prosthesis is functioning successfully for last two and half years.

## DISCUSSION

In case of mini implants we can have esthetics problems due to poor emergence profile whereby the cervical part is visible during a hearty laugh. So proper case selection and listening to the patient's feelings is very important.<sup>[1]</sup>

Due to the reduced diameter there are more chances of implant fatigue fracture. Teeth may intrude as much as 250  $\mu\text{m}$  while implant move only upto 2% of this. So as the teeth moves into its periodontal ligament space the implant prosthesis can strike directly against the opposing teeth and can undergo fatigue over a long period of time. Hence, we must relieve the prosthesis in centric occlusion during light as well as tight closure *i.e.*, 'long centric' should be established. However, there is no evidence-based implant specific concept of occlusion but above-stated occlusal scheme should be helpful.<sup>[1,3,4]</sup>

Use of mini implants is increasing consistently because of the ease and economy in treating atrophic ridges. Although augmentation can lead to the use of standard size implants it is time consuming, costly and tedious for patients specially aged ones.

As we insert a smaller metallic body into the bone bed, the blood supply to the surrounding tissues is better hence these implants may prove even superior to standard size implants.



**Figure 9:** IOPA radiograph showing two mini implants with prosthesis

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