

## Case Report

# Treatment of an anterior single edentulous space with a bicortical screw implant

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Dentistry has undergone many changes during the past quarter century; however, no changes have been more profound than those in the field of implant dentistry. With the introduction of the concept of osseointegration by Per-Ingvar Branemark and continued research in this area, the success rate of implants has been continuously increasing. However, the cost and time factor for healing and tissue integration and the need for ideal ridge forms with good bone in terms of both quality and quantity have been drawbacks of implant dentistry techniques. Bicortical implants minimize these drawbacks and provide an alternative treatment of choice. This article focuses on the placement of a bicortical screw implant to anchor a metal ceramic crown in the missing right lateral incisor region and restoring esthetics with contouring and composite veneering in the upper anterior region of a 21 year-old male patient's mouth.

**Key words:** Bicortical support, composite veneering, esthetic contouring, immediate loading implant, self-tapping screw

Traditional implants have been the treatment of choice over fixed bridges and removable prosthesis in recent years.<sup>[1]</sup> But many cases encountered in dental practices usually don't have ideal ridge forms. In such cases, bicortical implants can be used with great success.<sup>[2]</sup> They have a narrow upper body which suits a wide range of compromised ridge conditions and still have immediate and ongoing stability as they derive support from the bony cortices.<sup>[3]</sup> They can be immediately loaded using simple clinical and laboratory procedures and are economical.<sup>[4,5]</sup>

This article focuses on the placement of a self-tapping bicortical screw implant to anchor a metal ceramic crown in the anterior region of the patient's mouth.

### CASE REPORT

A 21 year-old male patient reported to the Dept. of Prosthodontics, Rural Dental College, Loni, with the chief complaint of a missing upper front tooth. The patient gave a history of loss of the tooth due to caries one year back.

Clinical evaluation revealed that the maxillary right lateral incisor was missing. There was midline diastema and slight spacing in rest of the maxillary and mandibular arch [Figure 1]. Preoperative radiographs [Figure 2] showed sound bone and adequate space for placement of a bicortical implant in the maxillary right lateral incisor region.

### Treatment plan

After thorough evaluation of the history, clinical condition, radiological evaluation, other necessary investigations, cost factor and considering the patient's need for an immediate fixed restoration, it was decided to place a 3.5 mm diameter and 21 mm insertion-length Bicortical screw implant in the edentulous space. Esthetic contouring and composite veneering of the maxillary and mandibular anterior teeth was planned. However, the patient didn't want any intervention in the lower arch so no efforts were made to modify the esthetics in the mandibular anterior region.

### Procedure

Thorough oral prophylaxis was done before any intervening procedures were carried out. Radiographic and other required investigations were done to rule out any systemic conditions.

Strict infection control measures were followed before and during the implant placement surgery to avoid any contamination of the placement site or the implant.<sup>[6]</sup>

A diagnostic template was prepared and was placed in the mouth to determine the desired implant position. A mark was made on the ridge with the help of a probe through a hole in the template and an incision was made along the mark. A full thickness muco-periosteal flap was raised to expose the bone at the insertion site. The template was used again to mark the point

of entry of the pilot drill. The external compact bone was entered with a slow-speed, 2 mm diameter pilot bur with constant cooling to avoid overheating of the osteotomy site.<sup>[6]</sup> The bur was stopped at tactile contact with the opposite cortical bone. The cancellous bone was coarse, hence no further drilling was required to

place a 3.5 mm diameter implant. Osteotomy with the 2 mm pilot drill is usually sufficient to screw a self-tapping 3.5 mm implant. The said diameter and length implant was screwed into the osteotomy with the help of a finger key with moderate apical pressure to the desired height [Figure 3]. The implant was checked



**Figure 1:** Pretreatment view of the case



**Figure 4:** Implant seen in place after soft tissue healing



**Figure 2:** Orthopantomogram (OPG) taken for evaluation of bone at edentulous site and the surrounding anatomical limiting structures



**Figure 5:** Composite veneering done on maxillary anterior teeth for space closure and esthetics



**Figure 3:** Implant inserted to desired position and height after preparation of the osteotomy



**Figure 6:** Posttreatment view

for sufficient occlusal clearance and position. Final adjustment for optimal position was done by 'bending' with the help of postbending pliers and holding instrument that comes with the system. The flap was then covered and sutured. A temporary crown was placed over the implant and splinted to the adjacent natural teeth on the same day. Cement was avoided as any overhanging could cause irritation while the gingival was healing. Postsurgical instructions were given and medication was advised and the patient was recalled after one week for suture removal and evaluation [Figure 4].

Esthetic contouring and composite veneering was done on the maxillary anterior natural teeth in the subsequent appointments [Figure 5]. Impressions were made for maxillary and mandibular arches followed by transfer of the implant analog into the master cast with the help of a transfer post. A metal ceramic crown was prepared in the laboratory and cemented over the implant after three weeks of the surgery [Figure 6]. The crown was kept slightly out of occlusion to avoid disturbance to the integrating implant.

## DISCUSSION

Bicortical screw implants provide an excellent option for restorations in the anterior region especially in cases in which a single tooth is missing. They are self-tapping, pure titanium implants requiring the use of one-phase insertion technique and are available in a variety of shapes, sizes and lengths to suit various ridge forms including compromised ones. The additional stability provided by this screw allows for immediate loading at the time of implant placement. Moreover, they are cost-effective, thus enabling dentists to select the optimal implant for each individual indication. They are mainly designed for maxillary and mandibular anterior regions although there have been claims of their placement in the premolar region without complications.

It is important to mention that in the present case, the esthetic outcome of the final restoration was outstanding except for the fact that the gingival emergence profile was missing. The ridge was narrow and low, as a result, the crown was seated 'over' the gingiva rather than 'within' the gingiva and the gingival contour was more of a visual effect.

## CONCLUSION

The premaxillary area is the most critical region of the mouth because esthetics, phonetics, function, occlusal pattern and patient awareness blend to provide a very specific incisal edge and contour position.<sup>[7]</sup> Anterior tooth loss usually compromises ideal bone volume and position for proper implant placement. Bicortical implants are an excellent alternative to traditional two-stage implant systems which require ideal bone conditions and time for osseointegration.<sup>[8]</sup> They can be placed in compromised ridges and immediately loaded and are economical, thus giving the dentist and the patient a viable option to look into implant therapy.

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