Dental Rehabilitation Using An Implant-Carrying Plate System in a Severely Resorbed Edentulous Maxilla: A Case Report

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This clinical article describes a case of dental rehabilitation using an implant-carrying plate system (EPITEC) for a patient with severely resorbed edentulous maxilla and microstomia. In this case, the presence of microstomia prevented bone augmentation procedures through an intraoral approach. Treatment using 2 endosseous implants inserted in the canine regions and an implant-supported overdenture was planned. However, endosseous implants were not feasible on the right side because of insufficient available bone volume. An implant-carrying plate system was then utilized on the right side. Four months later, an implant-supported ball-attachment overdenture was fabricated. At the 2-year follow-up, the clinical course remained uneventful, and the patient remained satisfied with the treatment. Int J Oral Maxillofac Implants 2008;23:117–120

Key words: *dental implant, edentulous maxilla, implant-carrying plate system, implant-supported overdenture, resorbed maxilla*

The use of endosseous implants is accepted as a safe and predictable method for rehabilitating patients with edentulous maxillae.[1] In patients with severe resorption of the maxilla, however, dental rehabilitation with endosseous implants is complicated because of limited bone volume. Several techniques have been described for implant treatment of the atrophic maxilla, including a bone-grafting procedure,[2–8] angulation of the implant,[9] zygomatic implants,[10] and the use of narrow implants.[11] The implant-carrying plate system (EPITEC; Stryker Leibinger, Freiberg, Germany) is an implant that differs in shape from other types of oral and maxillofacial implants and has the advantage that it can be used at the position where bone volume is insufficient for insertion of the endosseous implant.[12,13]

This article describes a case of dental rehabilitation using the implant-carrying plate system for a patient compromised with severe atrophy of maxilla and cicatricial contracture of the lip and cheek.

CLINICAL REPORT

A 69-year-old woman was referred to the Department of Special Dental Care and Oral Surgery, Shinshu University Hospital, for prosthetic rehabilitation using dental implants to improve retention of a dental prosthesis. The patient described a history of severe burn on the left cheek at the age of 2, and she had undergone repeated plastic and reconstructive surgical corrections between the ages of 2 and 20 years. After the treatments, she was satisfied with the cosmetic results, although cicatricial changes of the left cheek and commissure remained, resulting in microstomia (Fig 1). At 67 years of age, the patient had lost all remaining maxillary teeth and was using a conventional complete denture. However, retention and stability of the denture were poor. This was likely the result of inadequate residual ridge anatomy combined with contraction of the left cheek.

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Fig 1 Extraoral view of the patient at the first visit. Cicatricial changes of the left cheek and commissure were observed. Elasticity of the upper and lower lips and left cheek was restricted.

Fig 2 Preoperative panoramic radiograph.

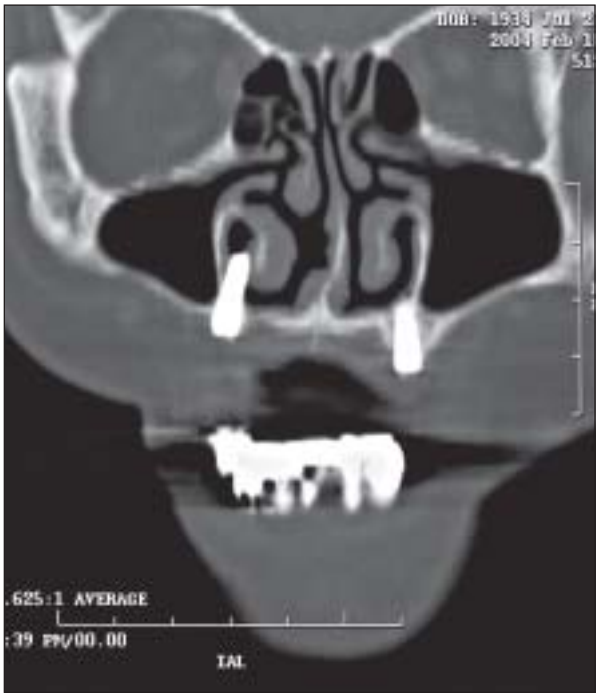

Fig 3 Reconstructed frontal cross-sectional view of the computerized tomographic scan parallel to the implants inserted in the canine regions.

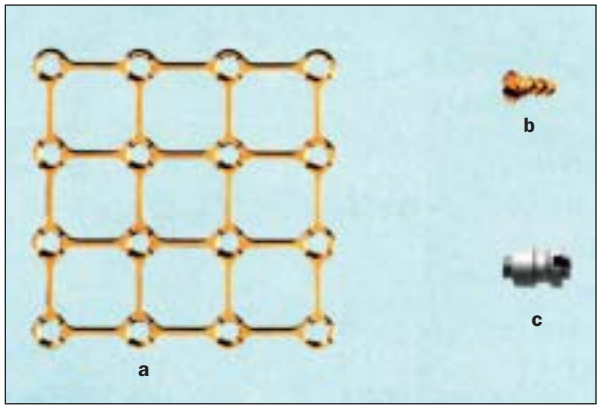

Fig 4 Main parts of an implant-carrying plate system (EPITEC): *(a)* 3-dimensional carrier plate, *(b)* bone screw, and *(c)* implant post.

A panoramic radiograph revealed an edentulous maxilla with distinct atrophy of the alveolar bone (Fig 2). The bone height under the nasal floor and the floor of the maxillary sinuses was insufficient for endosseous implant placement.

In implant treatment for the patient, bone augmentation procedures were first indicated. However, the presence of microstomia contraindicated the

Fig 5a Intraoperative view of a fixed carrier plate with bone screws.

Fig 5b Occlusal radiograph showing a carrier plate fixed at the right canine region with 8 bone screws.

Fig 6 Intraoperative view of an implant post penetrating the gingiva.

Fig 7a Intraoral view showing the ball attachments (counter die) secured to the implants.

Fig 7b Extraoral view of the patient after prosthetic rehabilitation with an implant-supported overdenture.

augmentation procedure through an intraoral approach. In addition, the patient refused any surgical operations that required extraoral incision and/or general anesthesia. The preoperative panoramic radiograph showed that there would be enough bone volume at the sinus-nasal wall of the maxilla (the canine region) bilaterally to insert endosseous implants. Therefore, prosthetic rehabilitation with bilateral dental implants at the canine region and an implant-supported overdenture was planned.

Under local anesthesia, two 13-mm dental implants (Microthread 4.5ST; Astra Tech, Göteborg, Sweden) were inserted bilaterally at the canine regions following the manufacturer's instructions. During the surgery, there was no indication that the nasal or sinus cavities were perforated. The wounds

were primarily closed in the normal manner, and the postoperative course was uneventful. However, postoperative radiographic examination revealed exposure of the implant to the right nasal cavity, and the top of the right implant was touching the inferior surface of the inferior nasal concha (Fig 3). Because it was estimated that there was no other area with sufficient bone volume to insert conventional root-form dental implants, dental rehabilitation using an implant-carrying plate system was decided upon, and the patient agreed to the treatment.

One month after the implantation, removal of the right implant and placement of an implant-carrying plate system was carried out. Under local anesthesia combined with intravenous sedation, an incision was made along the edge of the right alveolar ridge, and the labial and the palatal gingivo-periosteal flaps were reflected. After removal of the dental implant, the oro-nasal fistula was filled with crushed cortical bone harvested from the exposed sharp edge of the alveolar crest. Placement of an implant-carrying plate system (Fig 4) was performed in 1 step. A 3-dimensional carrier plate was trimmed to a 3 × 3 hole size and optimally adapted to the alveolar bony surface. It was affixed with 8 short (4- to 6-mm) bone screws to the right maxilla, so that the center of the carrier plate was situated on the right canine region (Figs 5a and 5b). An implant post was fixed in the center hole of the carrier plate. The gingivo-periosteal flaps were folded back, and the wound was closed with an implant post penetrating the mucosa (Fig 6). Four months after the second surgery, ball abutments were connected to the implants. An implant-supported ball-attachment overdenture was fabricated (Figs 7a and 7b). Two years after the second operation, the clinical course remained uneventful, other than an episode of transient peri-implantitis around the right implant post. The patient has remained satisfied with the dental rehabilitation with an implant-supported overdenture.

DISCUSSION

The implant-carrying plate system is a plate-type implant that has been developed for surgical anchorage of facial prostheses (eg, orbital, nasal, and auricular prostheses).[12,13] It was developed from titanium plate for fixation of a fractured jaw. This system is similar to the use of subperiosteal implants in that it is applied on the surface of cortical bone. However, it has an advantage in that the implant is primarily secured to the cortical bone with bone screws.

The major advantage of this system is that it can be used where bone volume is insufficient for insertion of an endosseous implant. It may be speculated that this system would provide inferior retention compared with endosseous implants. In this case, the patient was rehabilitated using an overdenture. The plate-carrying plate system supplied sufficient retention of the implant and the ball-attachment-supported overdenture. Although no loosening of the bone screws was evident on clinical and radiographic follow-up, it is possible that this system will provide little retention and poor long-term stability as compared with an endosseous implant. Long-term follow-up is necessary to fully evaluate this technique.

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