



Case report

Simple and less invasive technique for fixation of iliac inlay bone block using dental implants in the atrophied posterior maxilla

Keisuke Koyama^{a,*}, Toshihiro Hasegawa^a, Ikuhiro Uchida^b, Shunichi Yoshida^{a,b}^a Department of Dentistry and Oral Surgery, National Hospital Organization Kasumigaura Medical Center, 2-7-14 Shimotakatu, Tsuchiura, Ibaraki 300-8585, Japan^b Department of Dentistry and Oral Surgery, Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital, Tokyo, Japan

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ABSTRACT

The surgical technique and grafting materials used for sinus lift augmentation and simultaneous implant insertion were developed in the mid 1970s. New procedures were developed in the 1980s, in which iliac bone grafts were fixed to the residual ridge with implants. Today, less invasive techniques with lower morbidity have been developed for small bone defects, such as crestal elevation through the implant site. To treat severe atrophy and a bone height of less than 3–5 mm, other approaches are advantageous, such as the Caldwell–Luc entry. Depending on the severity of the situation, iliac crest bone block grafting guarantees high quantities of good bone for sinus augmentation. This report evaluates the usefulness of fixing the iliac crest bone block with implants. This technique significantly reduces the healing and waiting times and the number of operations.

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1. Introduction

Pathological resorption of the maxilla and downward extension of the sinus can occur following premature extraction of molar teeth. These changes can be the main causes of both functional and esthetic problems. Patients with advanced maxillary atrophy may suffer from loss of masticatory ability. Insufficient bone height and width in the posterior maxilla and atrophic reduction of the alveolar ridge often result in unfavorable conditions of the maxilla for implant placement.

The surgical technique and grafting materials used for sinus augmentation and simultaneous implant insertion were developed in the mid 1970s. New procedures were developed in the 1980s, in which iliac bone grafts were fixed to the residual ridge with implants [1–3]. Today, less invasive techniques with lower morbidity have been developed for small bone defects, such as crestal elevation through the implant site [4].

To treat advanced atrophy and a bone height of less than 3–5 mm, other approaches are advantageous, such as the Caldwell–Luc entry. Depending on the severity of the situation, iliac crest

bone block grafting guarantees high quantities of good bone for sinus augmentation [2,5].

In addition, to get the success of graft bone union, secure bone fixation is necessary. Generally a grafted bone is fixed by screws. After getting bone union, removing operation of the screws is needed.

This report evaluates the usefulness of fixing the iliac crest bone block using implants. This technique significantly reduces the healing and waiting times and the number of operations. All of these factors are clinically and psychologically important.

2. Case report

In 2007, a partially edentulous 51-year-old woman was referred to our Division for implant treatment. On clinical inspection, the bilateral maxillary premolars and molars and the left mandibular molars were lost. The remaining teeth were compromised by periodontal disease. The residual alveolar ridge had been resorbed and the occlusal vertical dimension was very small. The radiographic examination showed high pneumatization of the maxillary sinus associated with advanced resorption of the post-extraction alveolar ridge. The residual bone height was 2–5 mm on the left side and 1–6 mm on the right (Fig. 1).

We first provided the patient with basic periodontal treatment. The occlusal vertical dimension was improved with temporary prosthetics and a partial denture. Under general anesthesia, a mucoperiosteal flap was elevated to expose the lateral surface of the maxilla and an elliptical window was outlined. This window

[☆] AsianAOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

* Corresponding author. Tel.: +81 29 822 5050; fax: +81 29 824 0494.

E-mail address: chiptankoyama@yahoo.co.jp (K. Koyama).

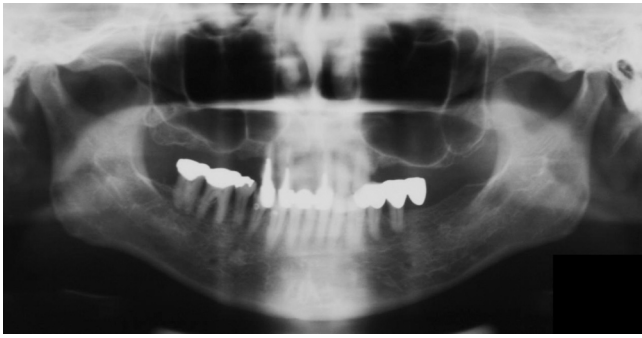


Fig. 1. Preoperative radiograph (2007) showing a high pneumatization of the maxillary sinus associated with an advanced resorption of the postextractive alveolar ridge.

was reflected superiorly and the sinus membrane was elevated (Fig. 2). These procedures were performed bilaterally.

A corticocancellous block (6 cm × 2.5 cm) was harvested from the anterior iliac crest, trimmed off as suitable shape for sinus and placed in the left sinus. This inlay block was fixed with the marrow surface down to the sinus floor with an implant placed in the anterior sinus (Fig. 3a and b). In this area, the residual bone height was 4 mm, which was sufficient for implant placement to achieve primary stability and simultaneously fix the bone block rigidly. In total, two implants were carefully placed holding the iliac bone block with a bone forceps. Posteriorly, the residual bone height was only 2 mm. Nevertheless, the posterior implant also obtained primary stability in the residual bone because the fixed inlay bone block with the first inserted implant rocked the posterior implant. The remaining space was filled with bone marrow harvested from the iliac crest.

Three implants were placed on the right side where the residual bone height was 4–5 mm, which was sufficient to achieve primary stability. The sinus was filled with cancellous particulate bone from the iliac crest. All of the implants placed bilaterally were 13 mm long (ASTRA TECH, OsseoSpeed).

Finally, the soft tissue flap was closed without tension using 4-0 sutures. One implant was placed in the left mandibular first molar area (Fig. 4). This procedure achieved bone volume restoration for implant insertion and the implants were placed simultaneously to

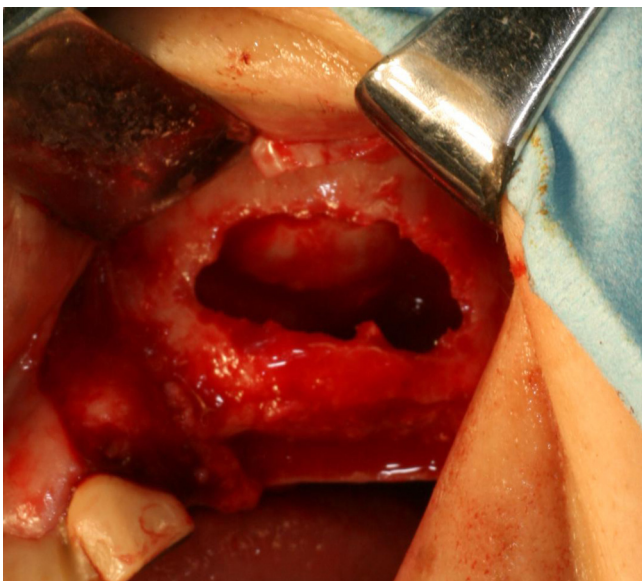
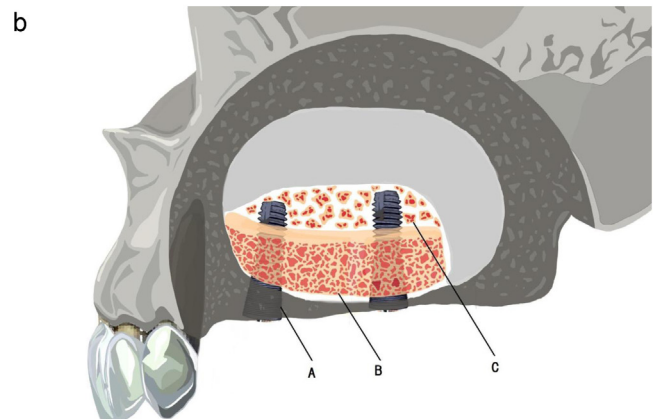
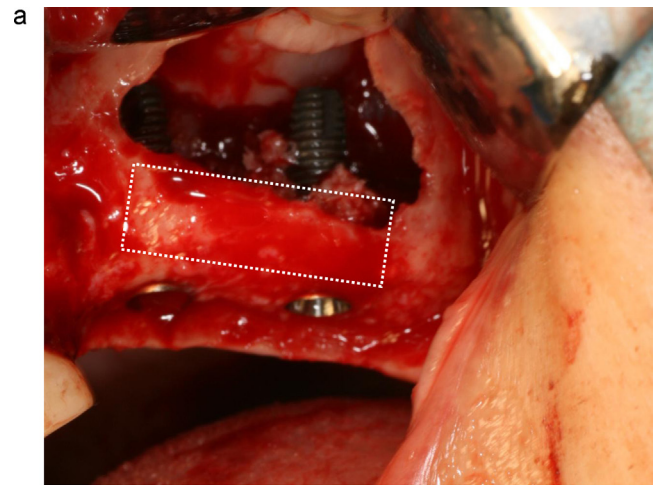


Fig. 2. Intraoperative site, the sinus membrane was elevated.



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Fig. 3. (a) The iliac bone block (dotted line area) was fixed with implants. (b) The schema of iliac bone block fixed with implants. (A) Residual bone height is enough to get the primary fixation of the inserted implant. (B) Trimmed iliac bone block is fixed with the anterior implant. (C) The sinus was filled with cancellous particulate bone from the iliac crest.

reduce the healing and waiting times. The patient resumed walking the day after the operation.

After 3 months, all of the implants were osseointegrated based on radiographic and computed tomography (CT) examinations (Fig. 5). Following an additional 3 months, the final prostheses were set. There was no implant loss after loading following follow-up for 5 years (Figs. 6 and 7). Although slight resorption of the iliac crest bone block and cancellous particulate bone transplanted in the sinus was confirmed by CT, the volume of the alveolar ridge was still sufficient (Figs. 8 and 9).

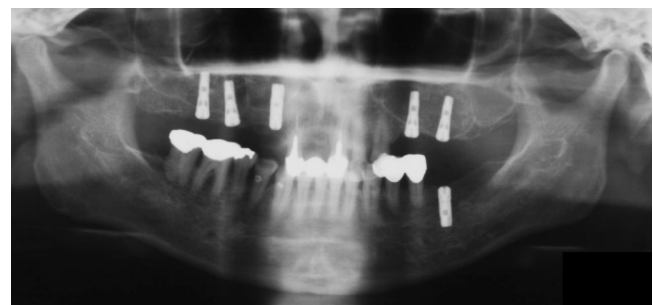


Fig. 4. Postoperative radiograph (9 October 2007).

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