

SHORT REPORT

## Reconstruction of Localized Defects of the Anterior Maxillary Ridge with Autogenous Bone Graft Before Insertion of a Single Implant

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The replacement of a lost anterior single tooth, whether by means of a conventional fixed restoration, an acid-etched restoration or an implant supported restoration, is one of the most demanding and challenging procedures in restorative dentistry (1,2).

Currently, endosseous implants are used with predictable success in various clinical situations. A significant problem, however, is insufficient height and width of the alveolar bone at the implantation site (3).

Based on clinical experience, the minimum dimensions in the maxilla to insert a dental implant are an alveolar ridge width of 5 mm and a bone height of 10 mm (3). Several surgical methods to create sufficient bone volume have been developed, such as autogenous bone grafts, guided bone regeneration, allogenic demineralized bone powder and hydroxyapatite, the titanium mesh with bone grafts technique, distraction osteogenesis, interpositional bone grafts and combinations of these procedures (3-7).

The aim of this study was to evaluate the use and applicability of intraorally harvested autogenous bone grafts to augment the thin maxillary lateral incisor region for a single dental implant.

### Case Report

A 31-year-old male sought treatment at our department complaining of a missing maxillary lateral

incisor. Clinical and radiological (panoramic and periapical) examinations revealed that the alveolar ridge height was normal, but that there was a lack of alveolar ridge width. Bucco-lingual atrophy of the edentulous alveolar ridge made it impossible to place an implant in this area. It was decided to augment the alveolar crest horizontally. The mandibular symphysis area was selected as the donor site for augmentation.

Under local anesthesia, a full thickness flap was raised to expose the defect, and the surface of the bone was freed from the remaining muscle and periosteal fibers.

The alveolar bone height was more than 10 mm. However, the width of the alveolar bone was 3 mm. Subsequently a monocortical autogenous bone graft was obtained from the symphysis area of the mandible (Figure 1a) by sulcular incision. Before placing the autogenous bone graft onto the missing lateral tooth area, it was prepared for adaptation to the area. A compact layer of the missing tooth area was removed in order to place the graft on a more nutritive spongy ground. The graft was then placed on this area with the cancellous side in contact with the jaw bone (Figure 1b). After screwing the autogenous bone graft onto the area with a 9 mm titanium miniplate screw (Figure 1c), small gaps in the edge of the autogenous bone graft were filled with Calcitite HA 2040 nonresorbable hydroxyapatite bone grafting material (Sulzer Medica Sulzer Calcitek Inc., Carlsbad, CA, USA) (Figure 1d).

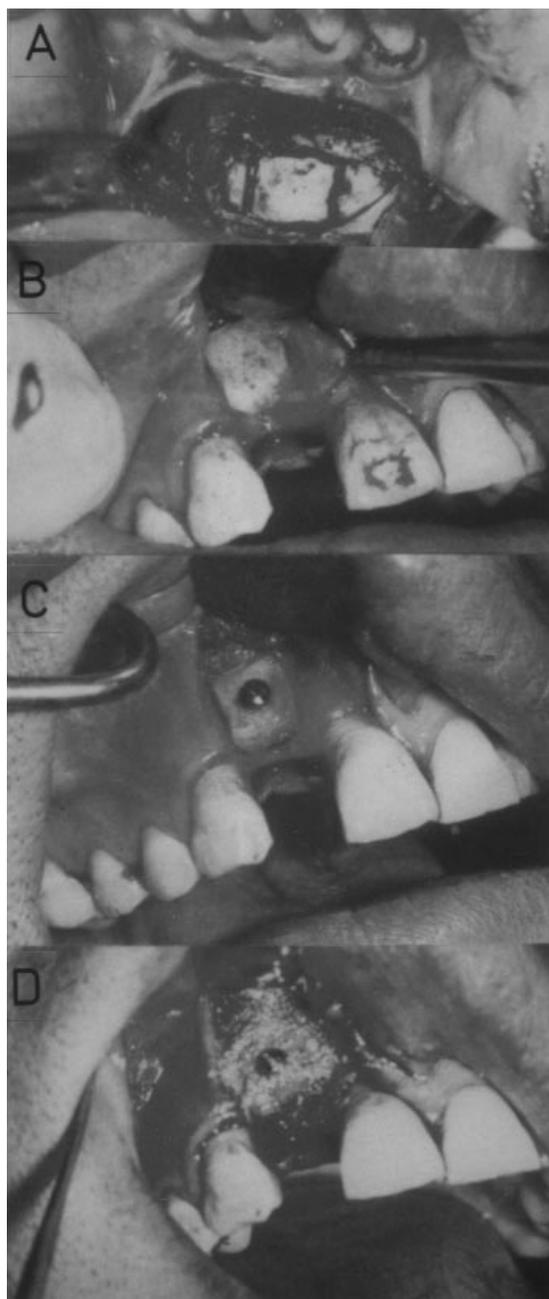


Figure 1. Clinical photographs of the first surgical procedure; a. View of the mandibular symphysis region, b, c. Autogenous block graft completion of the right maxillary lateral incisor region with screw fixation, d. Autogenous block graft and hydroxyapatite bone graft insertion.

The width of the alveolar process after augmentation was measured as 7.6 mm. Finally the periosteum of the mucoperiosteal flap was cut at its base to mobilize the flap and allowed to cover the bone graft without any tension.

A second operation was performed 3 months later. The screw stabilizing the graft was removed. It was seen that there was minimal resorption around the screw and the width of the alveolar bone was measured as 6.8 mm. A 3.7 x 16mm screw-vent type implant (Paragon Imp Co. Sulzer Medica, Encino, CA, USA) was inserted into this area and a Biomend extend 15 x 20mm absorbable collagen membrane for guided tissue regeneration (Sulzer Medica Carlsbad, CA, USA) was applied to the vestibular perforation caused by the stabilization screw.

Six months after the second stage surgery, periapical radiographs showed that osseointegration had been completed successfully (Figure 2). Therefore, there was no obstacle to moving onto the prosthesis stage.

The trial metal porcelain crown was processed and finished to completion. An interocclusal registration was made. The occlusion of the crown was corrected, and the crown was cemented onto the implant (Figure 3 a,b,c,d)

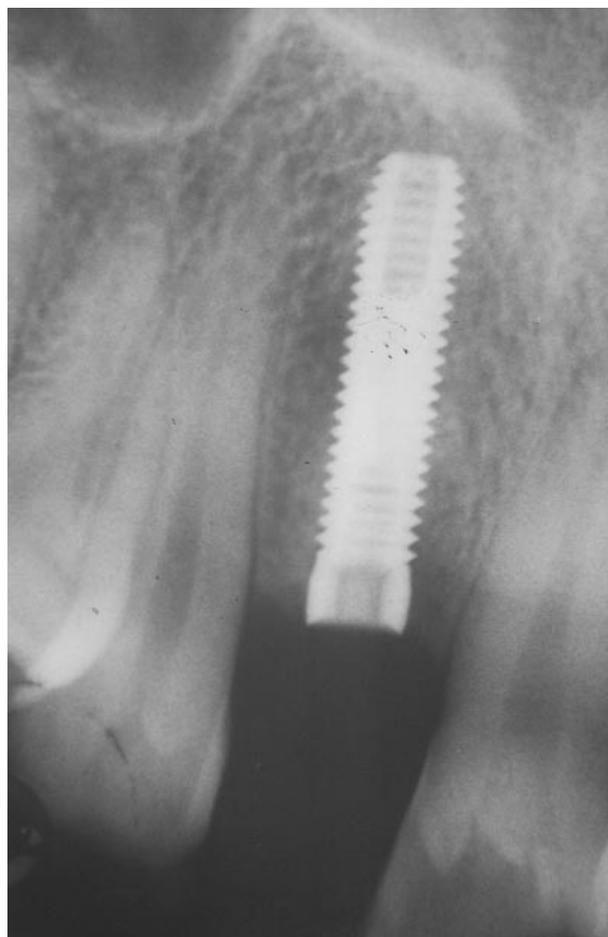


Figure 2. Periapical radiograph showing single implant in the right maxillary lateral incisor region.

On recall the patient tolerated the crown well in terms of function and aesthetics.

Augmentation or increasing the bone is carried out by various methods. Allogenic grafts can be used for this purpose like autogenous grafts. Allogenic demineralized bone powder and hydroxyapatite materials are used for increasing the width and height of the bone. The major limiting factor for bone regeneration in these methods appears to be compression of the augmented areas because of the instability of the allogenic materials (8). Since autogenous grafts are biocompatible, they are preferred to allogenic materials in reconstruction procedures. It has been accepted by several specialists that the main handicap with autogenous grafts is the secondary wound site. The donor site from which the graft is taken increases the infection risk postoperatively (3,4).

An alternative method of creating sufficient bone volume to allow reliable implant placement is sandwich bone grafts between the buccal and palatal cortices after carefully splitting the alveolar ridge (3). In our study, it was not possible to split the cortices because the alveolar crest was very thin.

The technique applied in this study allows clinicians to place implants in anatomic situations involving insufficient bone thickness. Moreover, dislocation of the vestibular cortical bone modifies the buccal profile so that it is possible to obtain a natural emergence profile of the teeth (5). In addition, the use of autogenous bone grafts appears to have had a beneficial effect on the degree of bone regeneration. However, in our case the marginal ridge of the bone was not formed satisfactorily. The resorption of the autogenous graft was greater than predicted. We decided to reconstruct this area in a vertical direction, but the patient refused another operation. In this respect we solved this problem with the prosthetic method of supplying an aesthetic facial appearance.

The another goal in this study was to protect the patient from discomfort or unnecessary radiation hazards. Therefore we used no other technique for measuring bone width. This could be possible with conventional or computed tomography.

Autogenous mandibular symphysis grafts can be successfully used for the augmentation of alveolar defects in the maxilla.

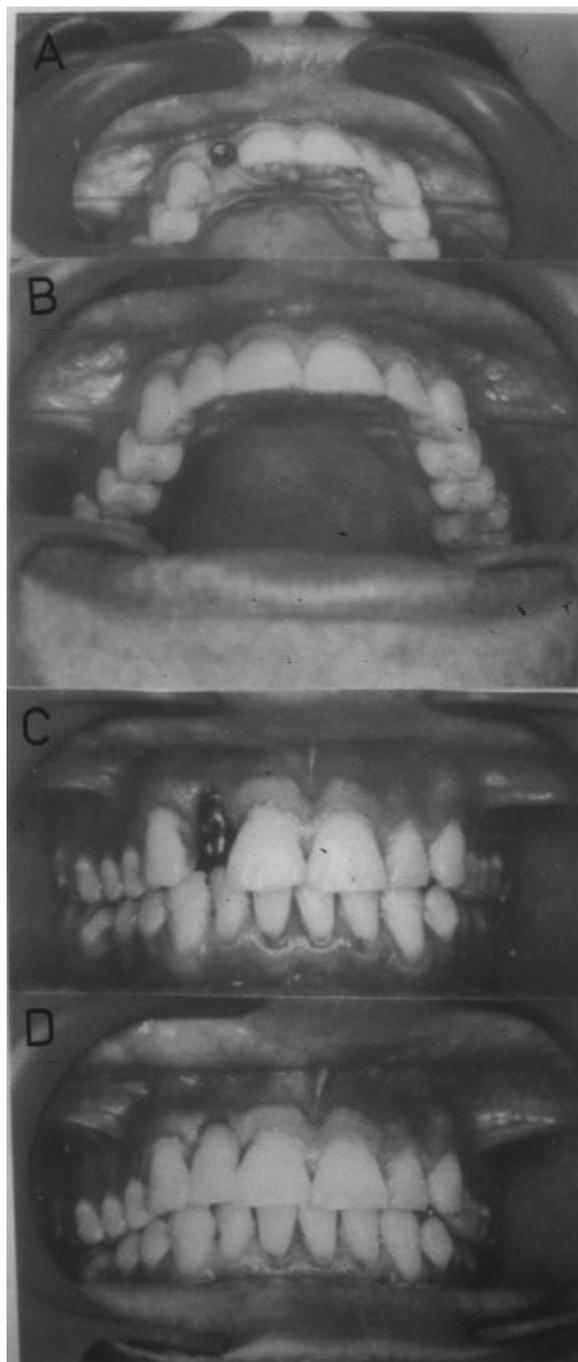


Figure 3. a,b,c,d: Clinical appearances of single implant supported crown.

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