Minimally Invasive Particulate Grafting for Esthetic Implant Site Development

Bach Le
Clinical Associate Professor, Department of Oral and Maxillofacial Surgery, USC School of Dentistry, Whittier Blvd, Whittier CA 90603, USA

Correspondence: Bach Le, Clinical Associate Professor, Department of Oral and Maxillofacial Surgery, USC School of Dentistry, Private Practice, 16157 E, Whittier Blvd, Whittier, CA 90603, USA, Phone: (562) 947-8611, Fax: (562) 947-8614 e-mail: leb 97201@yahoo.com

Abstract
It is well established that tooth loss leads to loss of alveolar bone, resulting in horizontal defects at prospective implant sites. This case report describes a technique of restoring these defects at the time of implant placement, using human mineralized allograft for optimizing esthetic results.

Keywords: Ridge augmentation, allograft.

INTRODUCTION
Tooth loss can result in loss of up to 40 to 60% of the alveolar ridge width within the first one to two years.1-3 The resulting ridge deformity can make implant placement difficult or compromise the esthetic result of the final restoration. Recently, socket grafting has been shown to decrease the amount of bone loss following tooth extraction. While this therapy may decrease bone loss, it does not prevent bone loss altogether. When small bony defects exist prior to implant placement and the implant is placed and restored without consideration for these defects, the result can be an unesthetic result (Figs 1A and B). Secondary connective tissue grafting can offer a beneficial intervention in these situations, but has many limitations including increased postoperative sequelae, surgical time, and increased expense with a second surgical site.4,5

The purpose of this article is to describe a technique for using human mineralized allograft to correct small labial contour defects through a novel open flap design with simultaneous implant placement in a single-staged approach. The author has successfully used human mineralized allograft for bone augmentation in various applications to correct bone defects in the maxillary and mandibular ridges with excellent results.6-9

SURGICAL TECHNIQUE
This simple procedure to augment small hard tissue defects involves direct exposure of the labial defect at implant

Fig. 1A: Occlusal view showing a concave horizontal defect in the maxillary 2nd premolar area

Fig. 1B: Buccal view of another horizontal defect in relation to a maxillary first molar. Note the unesthetic appearance
placement. Figures 2A to G demonstrates the use of this procedure coincident with implant placement for a moderate size horizontal ridge defect for edentulous site #7. The technique involves a crestal incision, slightly palatal to the midline to include a margin of keratinized tissue, with a full thickness subperiosteal pouch to the labial of the implant with a small distal vertical release if needed. For descriptive purposes, the author calls this incision design the “open book” incision. An osteotomy is made for placement of a 5 mm diameter Biohorizons Single-stage implant (Biohorizons, Inc., Birmingham, AL). Note that although the implant is completely covered with labial bone, failure to correct the bony contour defect will result in a dark shadow around the cervical margin of the final restoration, resulting in a compromised esthetic result. The human mineralized allograft bone (Miner Oss; Biohorizons, Inc., Birmingham, AL), is then placed against the labial with sufficient volume to correct the bony contour defect. Some resorption of the graft material is expected so it is important to over correct the defect. The patients own blood is used as a coagulant for better cohesiveness of the graft material. A resorbable membrane (OSSIX™ PLUS; OraPharma, Warminster, PA) is placed over the grafted sites. If there is adequate primary stability of the implant, then a single stage protocol is followed. After placing the bone it is critical to coronally advance the peri-implant soft tissue around the healing abutment by scoring the periosteum so that tension free closure can be obtained to ensure an adequate seal. Moderate to complete resorption of the graft material can be expected if there is not an adequate tissue seal with a tension free closure.

**DISCUSSION**

Reconstruction of the alveolar ridge to its original form will lead to improved implant esthetics, whereas failure to correct these defects prior to implant placement can lead to esthetic failures. Most mucogingival deficiencies around dental implants represent underlying bony defects. Even when there is adequate bone to place implants, irregular ridge anatomy can result in a compromised esthetic result with the final crown (Figs 1A and B). Furthermore, evidence suggest that an adequate amount of buccal bone is necessary to

Figs 2A to G: (A) A horizontal defect in a prospective implant site in relation to the maxillary left first molar area-Buccal view (B) Occlusal view of the same, showing the buccal concavity (C) Implant in place with the concavity evident apical to the crest of the implant (D) Healing abutment in place and the mineralized allograft packed into the defect to correct the bony contour (E) Resorbable membrane adapted over the particulate graft (F) Flap sutured (G) Completed restoration showing the drastic improvement in appearance of the buccal aspect.
minimize future facial bone loss and subsequent tissue recession after implant placement.4,5

Contemporary bone grafting techniques provide the implant surgeon with many predictable procedures for correcting these horizontal ridge defects. These procedures include autogenous block grafts from the mandibular ramus or symphysis, autogenous particulate grafts with titanium mesh, ridge-splitting and expansion techniques, and connective tissue grafts. However, these procedures increase costs, pain and time for patients, and are not without potential complications. Furthermore, these multiple surgeries can present serious obstacles for many implant patients, which makes this beneficial treatment inaccessible for many patients.

By using the mineralized particulate graft, we can reconstruct small soft tissue deficiencies by augmenting bony defects to give support to the overlying soft tissue and the contour needed for an excellent natural result. This can be done at the time of implant placement, thereby, negating the need for secondary hard or soft tissue grafting.

Correction of labial defects is just one of the many factors leading to excellent esthetic results. Just as important are treatment planning and case selection, correct implant placement, proper abutment selection and esthetic fabrication of the final crown. Particulate onlay grafts using mineralized allograft can be used to convert unhealthy and unesthetic gingival contours into favorable sites. In reviewing the various techniques to develop the implant site at the buccal aspect of the ridge, a simple technique to improve the peri-implant esthetics was demonstrated.

REFERENCES