Immediate implant placement into compromised sockets is challenging for clinicians. The 3-dimensional implant position, status of the buccal bone wall, and regeneration of the soft tissue contours all affect adequate esthetic and functional results. This clinical report presents a treatment protocol (a variation of the immediate dentoalveolar restoration concept) consisting of immediate implantation and the reconstruction of the buccal bone wall and gingival recession in a single procedure with a triple graft (cancellous and cortical bone and soft tissue graft). (J Prosthet Dent 2014;112:717-722)

The immediate placement of implants after tooth extraction is a common clinical practice, with a success rate similar to that of implant placement in healed sites. However, immediate implant placement in the esthetic zone is a challenging and complex procedure. To achieve optimal esthetic and stability outcomes with the immediate placement of implants in fresh sockets, a meticulous protocol for the surgical and prosthodontic procedures is necessary. Surgical considerations include the 3-dimensional (3D) positioning of the implants, primary stability, the presence of the buccal bone wall, and the soft tissue thickness. Prosthetic considerations necessary for soft tissue maturation include the correct design of the emergence profile, the harmony of the periimplant soft tissues relative to the adjacent dentition, the restoration color, and the contouring and polishing steps.

Reasons for tooth extraction and immediate implant placement include endodontic treatment failure, advanced periodontal disease, trauma, and root fracture, all of which are frequently associated with severe alveolar bone resorption and soft tissue loss. When the bone damage is extensive, as indicated by changes in the level of the gingival margin, the esthetic risk increases, and immediate loading is commonly contraindicated. To improve the esthetics and clinical efficacy, as well as to shorten the treatment period, a variation of the immediate dentoalveolar restoration (IDR) technique is proposed. This technique uses a bone and soft tissue reconstructive procedure involving immediate implant placement in sockets with severe buccal bone wall damage and gingival recession in a single clinical session.

PROCEDURE

1. After anesthesia, make an intrasulcular incision around the tooth to be extracted.

1. Abscess in right central incisor and poor soft tissue quality.
2. Extract the tooth with a minimally invasive procedure by using a periotome, a microlever, and atraumatic forceps to preserve the integrity of the remaining bone wall.

3. Carefully curette the socket to remove the granulation tissue and the remaining periodontal connective tissue. The socket walls should be probed in the apicocoronal and mesiodistal directions to assess the degree of bone damage and confirm the anatomic shape of the defect.

4. Insert the implant into the ideal 3D position, regardless of whether the gingival margin is not level. The implant platform should be placed 3 mm apical to the cementoenamel junction (CEJ) of the contralateral tooth. Anchor the implant to the palatal wall to provide correct space for buccal hard and soft tissue reconstruction (Fig. 3).

5. Test the interim titanium abutment, occlusal adjustment, and opacification of the metallic component with a composite opaque resin (Amelogen Plus OW; Ultradent Products Inc). An interim crown is made by using a previously prepared esthetic veneer with light-polymerizing composite resin. The ideal emergence profile with a concave contour is established on the interim crown (Fig. 4), allowing free space for better accommodation of the soft tissue and promoting a thicker and more stable gingival margin.

6. Evaluate the occlusion and excursive movements after the interim crown is screwed to the implant.

7. After finishing the prosthetic procedures, make a horizontal incision in the gingival papillae at the CEJ. Divergent incisions must follow the gingival recession pattern (Fig. 5). The purpose of the divergent incisions is to reposition the gingival tissue coronally, thereby minimizing trauma to the tissues and promoting scar-free, first-intention healing. Make an intrassulcular incision joining the incisions, and divide the flap above the divergent incisions. A microblade (69 WS; Swann-Morton) may be used for all incisions.

8. Remove the gingival tissue pedicles between the double incisions in the region of the papillae with a microblade or microscissors (Fig. 6).

9. Infiltrate the donor area with anesthetic at the base of the vestibule and in the palatine portion of the maxillary tuberosity.

10. Make a mucoperiosteal incision at the maxillary tuberosity by following the distal contour of the last molar, 2 or 3 mm from its distal side. This incision is followed by 2 mucoperiosteal relaxing incisions in the posterior direction, thus reproducing the shape of the contralateral tooth. Anchor the implant to the palatal wall to provide correct space for buccal hard and soft tissue reconstruction (Fig. 3).

Cone-beam computed tomographic image showed total absence of buccal bone wall.

Implant installed with palatine anchoring (Replace Select; Nobel Biocare).

Emergence profile with concave contour established on interim crown.

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the defect in the receptor region. After those 3 first mucoperiosteal incisions, divide the flap starting at the buccal line angle, then, directing the blade to the most posterior portion of the relaxing incisions, maintaining connective tissue 1 to 2 mm in thickness to cover the bone tissue (Fig. 7).

11. Cut the bone with a straight chisel (Schwert IDR Kit; A. Schweickhardt GmbH & Co KG) along the relaxing incisions to define the bone fracture line. Position the chisel initially perpendicular to the bone structure on the incision line surrounding the distal part of the last molar. After it has been inserted 2 or 3 mm with a surgical hammer, change the chisel’s angulation to be parallel to the outer surface of the

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**Figure 5:** Four incisions in gingival papillae area. Two horizontal incisions in gingival papillae (in area corresponding to cementoenamel junction of adjacent tooth), followed by 2 divergent incisions corresponding to gingival recession pattern.

**Figure 6:** Removal of epithelial part of pedicles between 2 incisions.

**Figure 7:** Flap division at donor site. Division starts at buccal angle and continues to posterior area, keeping uniform thickness of connective tissue over bone.

**Figure 8:** A, B, Triple graft is removed with straight chisel. Three layers of graft (connective tissue, cortical, and cancellous bone) are present.

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connective tissue. Deepen the chisel gradually as far as the distal limit of the relaxing incisions to obtain a uniform bone/gingiva graft (Fig. 8). After the bone is fractured, an incision is made in the distal portion of the connective tissue to remove the triple graft (cortical and cancellous bone and soft tissue graft), taking care to maintain an epithelial pedicle to ensure better nutrition for the flap that will cover the donor site. Additional cancellous bone is harvested from the same donor site with a chisel to fill the gaps between the triple graft and the exposed spirals of the implant. The graft is embedded in saline solution and transferred to the receptor site as soon as possible.

12. Manipulate the triple graft to reproduce the shape of the socket defect and then test to achieve better adaptation.

13. Compact the bone marrow harvested from the maxillary tuberosity in the buccal surface of the implant to cover the exposed implant threads (Fig. 9). The stability of this graft can be determined by the use of bone compactors (Schwert IDR Kit; A. Schweickhardt GmbH & Co KG). This step is done before inserting the triple graft.

14. Insert the triple graft carefully, leaving the bone portion in contact with
the previously packed bone marrow and the connective tissue portion in contact with the internal portion of the gingival flap (Fig. 10). The connective portion of the graft should be stabilized up to the level of the gingival margin that was moved coronally. The bone portion of the graft must be coincident with the implant platform. The connective portion of the graft must always be beyond the limits of the bone defect.

15. Stabilize the graft by suturing the connective tissue portion of the graft on the gingival flap. The definitive flap coaptation is obtained by suturing the papillae with simple stitches (Fig. 11).

16. Apply a torque of 20 Ncm on the attachment screw of the interim crown and seal the palatine orifice with provisional filling material (Fermit; Ivoclar Vivadent).

17. Finally, suture the gingival flap in the donor region with simple stitches.

18. Monitor every 2 days for the first 2 weeks and every 15 days for the next 4 months. After a period of 4 months, once the bone and gingival architecture
has been reestablished (Fig. 12), a zirconia abutment (Fig. 13) and ceramic crown is provided. The stability of the buccal bone wall is monitored by periodic cone-beam computed tomographic sagittal sections (Fig. 14).

DISCUSSION

A buccal bone wall with sufficient dimensions is a prerequisite to achieving stability and esthetic soft tissue contours in the esthetic zone. A lack of buccal bone wall to support the facial mucosa may lead to recession and an incomplete papilla. Thus, implant treatment goals must be expanded to include the reconstruction of these lost anatomic structures. The technique aims to restore the buccal bone wall and soft tissue contours by using the same procedure as for implant placement, thereby reestablishing esthetics and function. This technique is a variation of the IDR technique, which is indicated for immediate implant placement in compromised sockets and for the repair of soft tissue recessions. The stabilization of a thick graft tissue in a localized buccal wall defect is the most challenging part of the treatment in damaged sockets. Therefore, the manipulation of the triple graft with a rongeur to reproduce the same shape as the periimplant bone defect is fundamental, given that the stabilization of the triple graft is achieved by juxtaposing the bone defect borders.

The limitations of this technique include difficulty of access to the donor site, especially in patients with a small mouth opening. Another limitation is the low availability of tuberosity bone and soft tissue to restore large defects or more than 1 tooth. Limitations related to the receptor site include insufficient amounts of residual to make the primary stability of the implant feasible and gingival recession extending above the mucogingival line.

REFERENCES