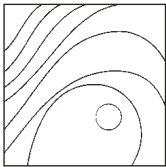


Buccal Plate Regeneration with Immediate Postextraction Implant Placement and Restoration: Case Reports



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The loss of the buccal alveolar plate following tooth extraction in the maxillary anterior region is an especially challenging condition for the clinician. Immediate implant placement with a flapless approach has been suggested in order to reduce postextraction bone loss. In the presence of a significant vertical gap in the buccal plate after tooth extraction, most authors still recommend a bone augmentation procedure before implant placement. In these reports, buccal bone plate regeneration was obtained through a flapless approach and immediate postextraction implant placement with a cancellous bone and collagen graft in the buccal gap. (Int J Periodontics Restorative Dent 2014;34:e67–e72. doi: 10.11607/prd.2025)

Esthetic restoration of anterior teeth with implant-supported restorations is one of the most challenging clinical situations. Following tooth extraction, the biologic cascade of events that takes place can cause alterations in hard and soft tissue contours, particularly in the anterior maxilla. These modifications could have significantly adverse esthetic effects. Immediate postextraction implants seem to have a success rate similar to implants placed in healed sites.^{1–4} Although it has been postulated that placing an implant into a fresh socket may be a predictable procedure, the real dimension of alveolar bone resorption remains uncertain. Recently, Wang and Lang⁵ concluded after a review of animal and clinical studies that implants placed in fresh extraction sockets do not prevent the resorption of the alveolar bone. A lot of factors seem to influence this process. According to Ferrus et al,⁶ the thickness of the buccal bony wall and the dimension of the horizontal gap influence hard tissue remodeling after postextraction immediate implants, and Tomasi

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et al⁷ suggest that the tridimensional positioning of the implant in the alveolar sockets also has to be considered.

The use of bone fillers can reduce bone resorption,^{8,9} but there are doubts regarding the esthetic outcomes of implants immediately placed in postextraction sites. Chen and Buser¹⁰ found that early (4 to 16 weeks of healing) implant placement is associated with a lower frequency of mucosal recession compared with immediate placement. Recently, some preclinical studies¹¹ suggested that a flapless approach added to immediate implant placement could reduce alterations in soft tissue contour. Other clinical studies demonstrated that immediate postextraction implant placement and provisionalization with or without bone filling of the implant-socket gap can result in a favorable esthetic and radiologic result with buccal plate preservation.¹²⁻¹⁴

This article presents two cases treated with immediately placed and restored implants with bovine cancellous bone granules and porcine collagen grafts (Bio-Oss Collagen, Geistlich) in esthetically challenging situations.

Case report 1

A 73-year-old white woman was referred to our dental office for the evaluation of mobility of a prosthetic crown on her right central incisor (Fig 1). Clinical examination indicated a fractured tooth with an unfavorable prognosis despite

the absence of a clear fracture line upon radiographic examination. There was a probing fistula on the gingival margin. Treatment with immediate placement of a dental implant was proposed to the patient. Immediate loading was considered a possible option. The patient was placed under antimicrobial prophylaxis with 2 g amoxicillin 1 hour before the procedure. After local anesthesia (mepivacaine 2% with adrenaline 1:100,000), the prosthetic crown was removed and tooth root extraction was carefully performed.

Following root extraction, a careful examination of the buccal bone wall was performed to verify its integrity. The buccal alveolar bone presented a fenestration with vertical resorption > 5 mm from the gingival margin. The immediate placement of the dental implant was performed with a flapless approach in an attempt to minimize soft tissue alterations. An implant (Ankylos plus, Dentsply; 3.5 × 14 mm) was inserted against the palatal bone wall at the palatal bone crest level. An insertion torque of 23 Ncm was registered. A cone beam computed tomography (CBCT; KaVo 3D eXam, Imaging Sciences International) scan was performed after the procedure, and a 3.22-mm vertical gap (from the implant shoulder) of the buccal bone was estimated on cross sections of the CBCT exam (Fig 2), while a 3.4-mm horizontal gap was evident on axial sections. However, this case was selected for immediate loading, with the buccal gap being filled with Bio-Oss Collagen.

There was no membrane placed over the graft, and no sutures were placed.

A straight prosthetic abutment with the correct transmucosal height was connected to the implant (Fig 3). After the root fragment was removed from the patient's old prosthetic crown, a gold coping was placed and properly adapted (Fig 4) according to the dimensions of the old crown. The coping was sandblasted, and the prosthetic crown was relined over the coping with resin. The crown was removed with the coping embedded, further relined with composite, trimmed, polished, and reinserted. Then the crown was engaged with the abutment using the conic coupling and a small quantity of PermaCem (DMG). Occlusal contacts with the mandibular teeth were checked and reduced but not eliminated. Systemic antibiotics were stopped, and an anti-inflammatory (ketoprofen 80 mg every 12 hours for 2 days) was prescribed, together with a chlorhexidine mouthrinse twice a day for 10 days.

At the 1-week follow-up the gingival margin appeared stable (Fig 5). After 6 months, clinical examination revealed no modifications of the keratinized tissues with respect to their appearance immediately postoperatively and at the 1-week follow-up. The CBCT scan showed good vertical regeneration of bone on the buccal aspect despite a reduction in width of the alveolar ridge (Fig 6). Clinical and radiographic examination at 16 months confirmed the stability of the result (Figs 7 and 8).



Fig 1 (left) Preoperative clinical condition. The fistula on the keratinized gingival tissue is evident.

Fig 2 (below) Vertical gap estimated on the CBCT scan.



Fig 3 The straight abutment in place.



Fig 4 The adapted and sandblasted gold coping was tested on the abutment.



Fig 5 (left) Clinical examination 1 week after implant placement.

Fig 6 (below) CBCT scan performed at the 6-month follow-up showed buccal bone regeneration.



Fig 7 (left) Clinical examination at the 16-month follow-up.

Fig 8 (below) The CBCT scan performed at the 16-month follow-up confirmed the buccal bone regeneration.





Fig 9 (far left) Preoperative radiograph. Conservative treatment of the root is evident.



Fig 10 (center) Gingival recession on the left lateral incisor.

Fig 11 (below) CBCT scan performed after implant positioning.



Fig 12 The adapted, sand-blasted, and opaqued gold coping was tested on the abutment.



Fig 13 Provisional crown engaged with the abutment.

Case report 2

A 35-year-old white woman was referred to our dental office for evaluation of root resorption of her maxillary left lateral incisor, which had been conservatively treated 2 years earlier (Fig 9). The maxillary incisors had been rehabilitated with four metal-free ceramic crowns. Substantial gingival recession and bone loss were present on the buccal surface of the maxillary left lateral incisor (Fig 10). Treatment with immediate dental implant placement and immediate provisionalization was proposed and accepted by the patient.

The patient was placed under antimicrobial prophylaxis with 2 g amoxicillin 1 hour before the

procedure. After local anesthesia (mepivacaine 2% with adrenaline 1:100,000) the prosthetic crown was removed, and atraumatic extraction was performed. Following extraction and immediate implant placement, clinical examination showed a fenestration with vertical resorption > 3 mm from the gingival margin and a horizontal gap of approximately 2 mm. The immediate placement of the dental implant was performed with a flapless approach in an attempt to minimize soft tissue alterations, with the implant (Ankylos plus, 3.5 × 14 mm) inserted against the palatal bone wall at the palatal bone crest level. An insertion torque of 24 Ncm was registered. CBCT performed after the procedure showed that the implant

shoulder was placed 1 mm below the buccal crest level (Fig 11). The buccal defect was completely filled with Bio-Oss Collagen. The graft was not covered with a barrier membrane, and no sutures were placed. A prosthetic 15-degree abutment with the correct transmucosal height was connected to the implant, and prosthetic procedures followed according to case 1 noted above (Figs 12 and 13).

The 3-month postoperative exam revealed stable keratinized tissue, so the provisional crown was relined, and the emergence profile was sculpted to favor gingival downgrowth. At the 6-month follow-up the gingival height was significantly improved (Fig 14). At the 1-year follow-up, the CBCT



Fig 14 (above) (a) Preoperative clinical condition compared to (b) the clinical condition at the 6-month follow-up. Improvement of gingival height is evident.



Fig 15 CBCT scan performed at the 1-year follow-up showed good vertical regeneration of the buccal crest above the implant shoulder and along the abutment.



Fig 16 Definitive prosthetic rehabilitation.

scan demonstrated good vertical regeneration of bone on the buccal aspect above the implant shoulder even though the horizontal projection of the buccal bone was reduced (Fig 15). Definitive prosthetic rehabilitation with metal-free ceramics was performed on all the maxillary incisors for better management of the esthetic result (Fig 16).

Discussion

Implant placement in the maxillary anterior region poses the greatest esthetic challenges in implant dentistry. According to the traditional protocols, 2 to 3 months of alveolar ridge remodeling following tooth

extraction and a supplementary 3 to 6 months of load-free healing are necessary for implant osseointegration. Attempts to shorten the overall length of treatment period and to preserve the harmony of soft and hard tissue have focused on approaches like immediate implant placement into fresh extraction sockets.

Recent reviews⁵ show that implants placed into fresh extraction sockets with or without loading do not prevent the resorption of the alveolar bone. When a flapless approach is added to the procedure, the risk of unpredictable tissue healing increases as no visual reference for the shape and volume of the buccal bone wall is available.¹⁵ Conversely, several authors

perform the flapless approach with immediate postextraction implant placement and bone graft filling of the alveolar gap with good clinical esthetic results.¹²⁻¹⁴ The possibility of preservation of the buccal plate with immediate placement of a single implant in a fresh extraction socket and its immediate restoration was also confirmed by radiologic studies with follow-up of up to 7 years.^{14,16} Other studies suggest that immediate implant placement and provisionalization should not be performed in cases of buccal bone defects extending to the buccal crest because these situations require a staged procedure with hard tissue grafting before implant placement and connection of a restoration.^{17,18}

However, the use of the Bio-Oss Collagen graft has been demonstrated to be efficacious for filling the alveolar gap at immediate implants.^{14,19} Within the limitations of a case report, the present article suggests that a conservative flapless approach together with a Bio-Oss Collagen graft can produce regeneration of the buccal plate along the surface of a square-threaded, grit-blasted, and acid-etched implant surface in the absence of gingival contour modifications, albeit with a reduced horizontal width of the buccal bone.

In the first case, the reutilization of the old metal-ceramic crown represents an advantage in terms of cost for the patient. In the second case, the hard tissue response to the treatment above the implant shoulder and along the abutment allowed the achievement of good soft tissue stabilization and a pleasing esthetic result.

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