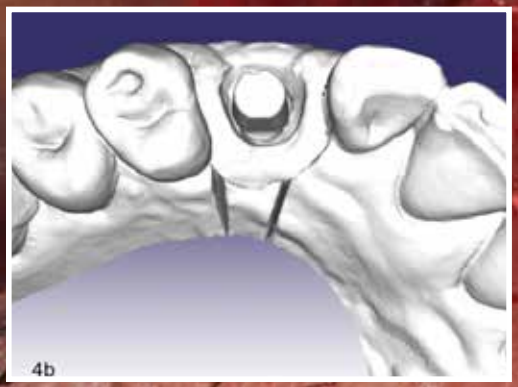
Volume 11, No. 3 September 2019

JIACD
The Journal of Implant & Advanced Clinical Dentistry

# Perserving the Buccal Plate

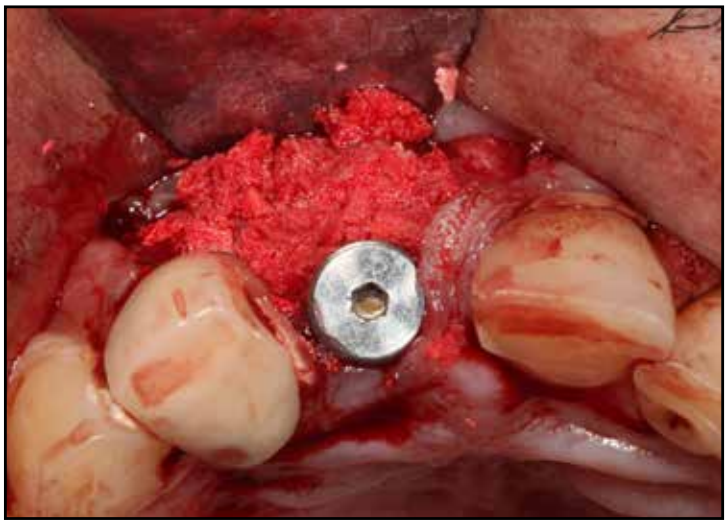



## New Implant Impression Technique

# Preserving the Buccal Plate with a Novel Bone Graft Material for Immediate Implants in the Esthetic Zone

**Lanka Mahesh, BDS, MBA[1] • Gregori M. Kurtzman, DDS[2]**
**Praful Bali, MDS[1] • Varun Raj Kumar, MDS[1]**

## Abstract



Implant placement into immediate extraction sockets can present with clinical challenges especially in the esthetic zone. Preservation of the buccal plate is critical to maintaining the position of the gingival tissue so that recession does not compromise esthetics. Position of the implant with respect to the buccal plate is important to allow sufficient thickness of bone, which in the extraction socket will result in a gap between the buccal socket wall and the implant. Grafting of this void aids in maintaining the crestal bone level in its position and the gingival crestal position. This article discusses a novel osseous graft material for use on filling the socket void at implant placement.

**KEY WORDS:** Dental implants, immediate implant, tooth extraction, guided bone regeneration, GBR

1. Private practice, New Delhi, India
2. Private practice, Silver Spring, Maryland, USA

**Figure 1:** Patient presented with right maxillary central incisor that was broken down to to gingival level with resulting hyperplastic gingival tissue.

## INTRODUCTION

In recent years, most advanced way to replace missing teeth is dental implant, which is designed to replicate the natural tooth. This procedure preserves the gingival mucosa and bone with no damage to adjacent teeth. Conventional procedure for implant placement involves extraction of affected tooth, waiting 2–4 months for extraction socket to heal, insertion of implant, and again healing period for 3–6 months for integration of implant with surrounding bone; after this procedure, another surgery is necessary to expose the implant and to place a prosthetic abutment[1] Taking into consideration the prosthetic treatment, the patient has to wait up to 8–12 months for a lost tooth to be replaced. Because of these shortcomings related to conventional technique, strategies were developed to substantially shorten the entire treatment by placement of implant immediately after extraction of tooth.[2]

The correct placing of immediate implants in relation to the alveoli bone walls is another

**Figure 2:** Periapical radiograph identified previous endodontic treatment and caries at the coronal aspect with close proximity to the adjacent tooth at the distal.

paramount factor for satisfactory results. Since bone tissue suffers constant remodeling, both vertically and horizontally during the healing process, all dimensions must be carefully taken into consideration for adequate three-dimensional implant positioning.

Regarding the horizontal positioning of immediate implants (buccolingually or mesiodistally), it is common to observe a lack of adaptation to the socket walls in the cervical portion of the implant. This gap can be filled by soft tissues and thus may lead to osseointegration problems. The use of membranes and/or grafting materials

**Figure 3:** The residual root was extracted presenting with a thin facial osseous plate to the extraction socket.

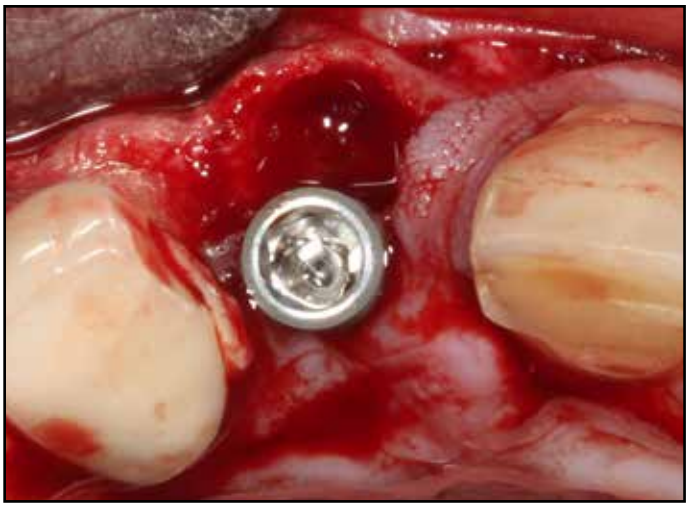


**Figure 4:** The implant was placed in the ideal prosthetic restorative position leaving a large gap between the facial aspect of the implant and the facial wall of the extraction socket.

to fill the peri-implant residual defects has been proposed.[3-8] Such procedures can impede epithelial invagination into these defects maintaining the necessary space for osteogenesis. Some authors associate these procedures with some complications, such as membrane exposure and delayed peri-implant bone healing.[9] On the other hand, some studies showed increased bone-implant contact after membranes were utilized.[10]

In an attempt to optimize osseointegration, many bone-replacing materials have been presented as an alternative to fill these gaps. These materials, which may be xenogeneic (osteoconductive), allogeneic (osteogenic), or synthetic (osteoinductive) exhibit properties and act as a scaffold for cell adhesion and proliferation, thus facilitating gap filing.[11-13]

Among the emerging biomaterials, Ossix bone (Datum Biotech, Lod, Israel) , is a new novel material which has shown promising results and has been presented in this case report. Ossix bone is a sterile, biocompatible bone grafting material aimed to fill, augment, or reconstruct periodontal and bony defects of the maxillo-facial complex. Ossix bone is a crosslinked collagen containing compound that is shapeable, yielding an ossifying scaffold for the growth of natural bone in periodontal and implant procedures. Its unique design makes it easy to use, has no particle migration and actively integrates with host tissue. Ossix bone is composed of 80% crystalline hydroxylapatite and 20% porcine collagen that are constructed together to form porous spongious matrix. After it is soaked in saline it has excellent handling properties. Ossix bone is an osteoconductive bone grafting material that serves as a scaffold for bone forming cells when placed into bony gaps.

## CASE REPORT

A 45-year-old male reported to clinic with a fractured right central incisor (Fig 1). Radiographic

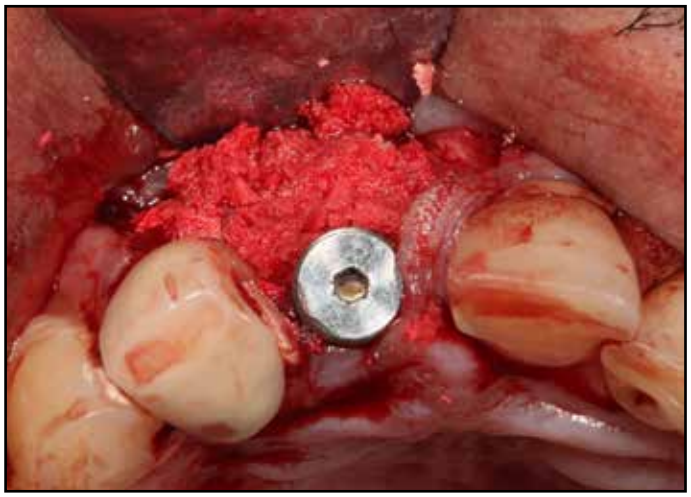


**Figure 5:** Ossix graft material that had been wetted by sterile saline was placed into the facial void.

examination noted prior endodontic treatment with an inadequate ferrule present to attempt restoration (Fig 2). After evaluation and discussing other treatment options like post and core following osseous crown lengthening, a dental bridge, an immediate implant was planned. Patient was found to be healthy with no underlying medical condition and without any history of smoking or tobacco use. After local anesthesia administration, a full thickness flap was created and elevated, then an uneventful removal of the residual root was performed (Fig 3). Drilling for implant placement was performed under copious cold saline irrigation to minimize heat generation by the implant drill. A Bioner top DM (Bioner, Barcelona) 4mm by 11.5mm dental implant was placed in the osteotomy. After placement a jumping distance of more than 3.5 mm was noted between the implant and facial bone (Fig 4). After wetting the Ossix graft material for 4 minutes with sterile saline, the bone graft was placed into the facial void to fill the jumping distance (Fig 5). A healing abutment of 3 mm height was placed and a radiograph taken (Fig 6). The flap was repositioned to achieve primary closure around the healing abutment and secured with 4-0 nylon sutures with no membrane placed (Fig 7). A temporary bonded bridge was placed on the patient the next day.

**Figure 6:** Periapical radiograph immediately following implant and graft placement with a healing abutment placed.

After uneventful healing of 4 months, a CBCT was taken that showed good maturation of the bone graft and complete fill of the jumping space filling the void in the extraction socket at implant placement (Fig 8). After removal of the healing abutment, excellent buccal volume of tissue can be appreciated and a lack of inflam-

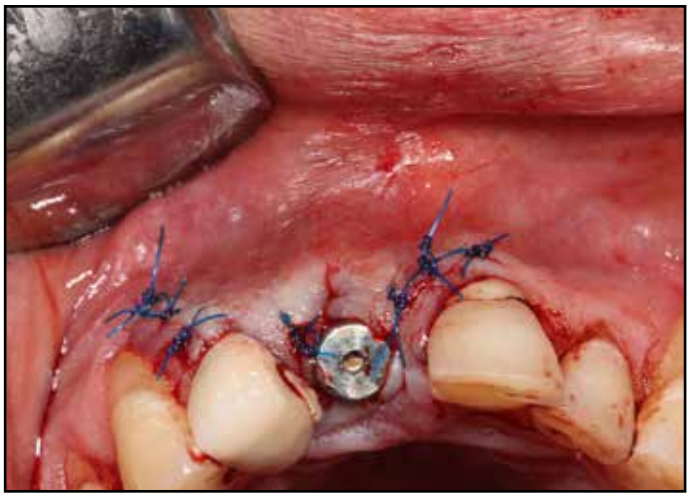


**Figure 7:** The flap was repositioned to achieve primary closure around the healing abutment and secured with sutures.

mation at the gingival cuff around the implant (Fig 9). A screw retained metal ceramic crown was fabricated and the patient was restored with pleasing esthetics (Fig 10). The final radiograph was taken demonstrating complete seating of the restoration at the implant connector and stable bone around the implant (Fig 11).

## DISCUSSION

Innumerous modifications have been proposed to achieve faster, reliable and more esthetic results in dental implants since its introduction, one of the major being placing an immediate implant after extraction, as compared to the standard protocol of waiting for healing of the extraction site. Several classic studies from the 1960's showed the resorption of the alveolar process following tooth extraction, which is significantly more pronounced in the buccal region.[14]

When teeth are present, blood flow is provided through 3 main sources: the periodontal ligament, the periosteum, and the bone tissue.

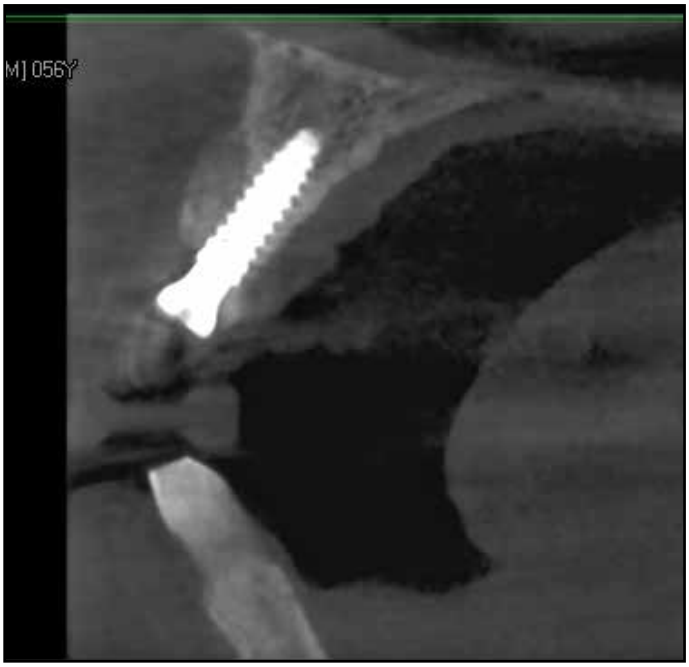


**Figure 8:** A CBCT as taken at 4 months post graft and implant placement to assess the graft maturation and elimination of the facial socket void.

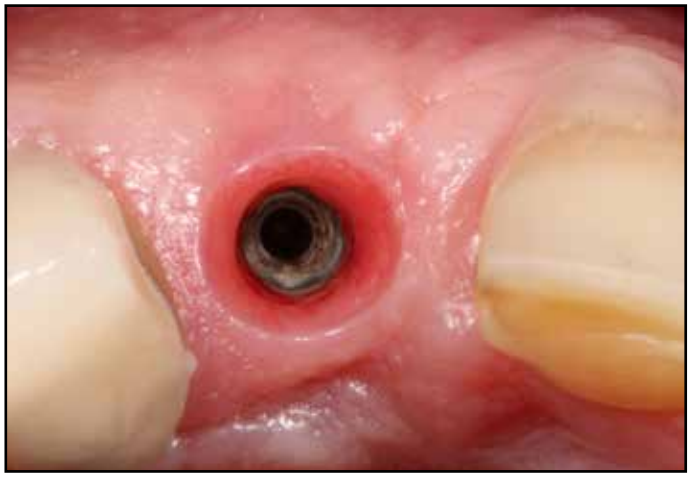


**Figure 9:** The healing abutment was removed from the implant demonstrating a healthy gingival cuff around the implant.

After a tooth is extracted, the periodontal ligament disappears, and only 2 nourishment sources remain. In addition, the cortical bone is poorly vas-

**Figure 10:** Final screw retained porcelain to metal crown was placed and screw access was sealed with composite.

cularized when compared to the medullary bone; therefore, when a flap is raised for implant placement, supraperiosteal blood supply ceases, leaving only the poorly vascularized bone without its medullary component, leading to bone resorption in the initial stages.[15] Such bone remodeling in response to inadequate blood supply becomes more critical in the buccal region due to characteristics naturally inherent to this region's nature and anatomy, which may lead to serious compromises both for osseointegration and esthetics.[16]

Deficiency of facial bone anatomy has a negative impact on esthetics and is a critical causative factor for esthetic implant complications and failures.[17] Experimental studies on canine mandibular premolar sites revealed substantial structural and dimensional alterations to the facial bone wall of the extraction socket.[18,19] These catabolic changes are initiated by resorption of the bundle bone that lines the extraction socket. They are correlated with the disruption of blood supply from the periodontal ligament and significant osteoclastic activity.[18,19]

**Figure 11:** A radiograph as taken of the final screw retained restoration to verify complete seating of the restoration at the implant connector.

## CONCLUSION

Ossix bone seems to be an ideal choice in cases such as mentioned in this report.

The handling properties, less spillage compared to particulate grafts, ease of packing in defects and good bone turnover are some of the factors, which in the authors opinion makes Ossix bone a good material.

**Correspondence:**
Correspondence
Dr. Gregori M. Kurtzman
dr_kurtzman@maryland-implants.com

**Disclosure**
The authors report no conflicts of interest with anything in this article.

**References**

1. Schropp L, Isidor F. Timing of implant placement relative to tooth extraction. J Oral Rehabil. 2008;35(Suppl 1):33–43.
2. Singh A, Gupta A, Yadav A, Chaturvedi TP, Bhatnagar A, Singh BP. Immediate placement of implant in fresh extraction socket with early loading. Contemp Clin Dent. 2012;3(Suppl 2):S219–22.
3. Becker W, Dahlin C, Becker BE, et al. The use of e-PTFE barrier membranes for bone promotion around titanium implants placed into extraction sockets: a prospective multicenter study. Int J Oral Maxillofac Implants. 1994;9:31–40.
4. Bra¨gger U, Hammerle CH, Lang NP. Immediate transmucosal implants using the principle of guided tissue regeneration (II). A cross-sectional study comparing the clinical outcome 1 year after immediate to standard implant placement. Clin Oral Implants Res. 1996;7:268–276.
5. Gher ME, Quintero G, Assad D, Monaco E, Richardson AC. Bone grafting and guided bone regeneration for immediate dental implants in humans. J Periodontol. 1994;65:881–891.
6. Gelb DA. Immediate implant surgery: three-year retrospective evaluation of 50 consecutive cases. Int J Oral Maxillofac Implants. 1993;8:388–399.
7. Scarano A, Iezzi G, Petrone G, Marinho VC, Corigliano M, Piattelli A. Immediate postextraction implants: a histologic and histometric analysis in monkeys. J Oral Implantol. 2000;26:163–169.
8. Kohal RJ, Mellas P, Hu¨rzeler MB, Trejo PM, Morrison E, Caffesse RG. The effects of guided bone regeneration and grafting on implants placed into immediate extraction sockets. An experimental study in dogs. J Periodontol. 1998;69:927–937.
9. Gher ME, Quintero G, Assad D, Monaco E, Richardson AC. Bone grafting and guided bone regeneration for immediate dental implants in humans. J Periodontol. 1994;65:881–891.
10. Gelb DA. Immediate implant surgery: three-year retrospective evaluation of 50 consecutive cases. Int J Oral Maxillofac Implants. 1993;8:388–399.
11. Molly L, Vandromme H, Quirynen M, Schepers E, Adams JL, van Steenberghe D. Bone formation following implantation of bone biomaterials into extraction sites. J Periodontol. 2008;79:1108– 1115.
12. Karring T, Thorkild J, Lindhe J, Pierpaolo C. Terapia periodontal regenerativa. In: Lindhe J, Thorkild J, KarringT, Lang NP, eds. Tratado de Periodontia e Implantologia Oral. 4th ed. Rio de Janeiro, Brazil: Guanabara Koogan; 2005:641–646.
13. Schopper C, Ziya-Ghazvini F, Goriwoda W, et al. HA/TCP compounding of a porous CaP biomaterial improves bone formation and scaffold degradation–a long-term histological study. J Biomed Mater Res B Appl Biomater. 2005;74:458–467.
14. Ramfjord SF, Costich ER. Healing after exposure of periosteum on the alveolar process. J Periodontol. 1968;39:199–207
15. Pennel BM, King KO, Wilderman MN, Barron JM. Repair of the alveolar process following osseous surgery. J Periodontol. 1967; 38:426–431
16. Becker W, Goldstein M, Becker BE, Sennerby L. Minimally invasive flapless implant surgery: a prospective multicenter study. Clin Implant Dent Relat Res. 2005;7(suppl 1):S21–S27
17. Chen ST, Buser D (2009). Clinical and esthetic outcomes of implants placed in postextraction sites. Int J Oral Maxillofac Implants 24(Suppl):186-217.
18. Cardaropoli G, Araujo M, Lindhe J (2003). Dynamics of bone tissue formation in tooth extraction sites. An experimental study in dogs. J Clin Periodontol 30:809-818.
19. Araujo MG, Lindhe J (2005). Dimensional ridge alterations following tooth extraction. An experimental study in the dog. J Clin Periodontol 32:212-218.