

Maximizing implant esthetics by preservation, regeneration of the alveolar bone

By Barry P. Levin, D.M.D.

The differences between natural teeth and dental implants are vast. The lack of a periodontal ligament (PDL) not only results in total immobility or functional ankylosis, but eliminates one of the two sources of blood supply to the marginal mucosa.

The only source of vascularity is derived from supraperiosteal vessels, making the presence and thickness of facial bone crucial for the long-term stability of soft tissues. It is therefore of paramount importance for the surgeon to take all steps possible to perform minimally-traumatic extractions, without inducing trauma to the osseous tissue.

This is extremely important when placing immediate implants in the esthetic zone. Trauma to the often-thin buccal plate of bone, composed mainly of bundle bone, compromises blood supply. This can lead to impaired wound healing and unpredictable soft tissue levels following implant placement.

Unlike conventional extraction procedures, where the primary goal is to remove the involved tooth, extractions followed by implant placement require more sophisticated instrumentation geared toward minimizing trauma to the alveolar bone, without complicating tooth removal.

The introduction of the Periotope was a significant advancement in the evolution of the extraction armamentarium. Severing PDL fibers, without distortion of the thin socket walls, offered clinicians an opportunity to extract teeth with more precision and less surgical trauma. The necessity for leverage, after severing these PDL fibers, created the need for an instrument that functioned similar to a thinly designed Periotope, but one that provided more strength for luxation, without creating minor fractures of the alveolar plate.

The X-Otomes by A. Titan Instruments are the logical choice for this step. With their thin, concave design and various angulations, the sharp narrow tips preserve tissue structures and eliminate bone fracturing. The X-Otomes fit along the root surfaces and provide the ability to luxate teeth. Often, these instruments can be utilized in repetitive order to gradually "work down the root surface" to separate the tooth from the alveolar walls.

The application of X-Trac Forceps by A. Titan Instruments, with their modified beak designs, are geared toward root engagement, without alveolus distortion, to complete this type of extraction.

After the teeth are carefully extracted, either immediate implant placement or site-development can be performed. The



A. Titan's X-Otome Luxation.



A. Titan's X-Tract Forceps.

key step of bone preservation gives the surgeon optimal flexibility in choosing which procedure can be executed.

When immediate implant placement is performed, restoratively driven placement and augmentation steps are performed, resulting in excellent esthetic outcomes. The implant position should respect established guidelines to preserve proximal and radicular bone and provide a healthy sulcus for long-term peri-implant mucosal health.

Often, bone grafting and guided bone regeneration (GBR) is performed simultaneously with implant delivery. This augmentation is usually required to provide sufficient thickness (2-4 mm) of bone for long-term soft tissue support.

An example is shown where a 65-year-old male required extraction and replacement of teeth #7, #8 and #9. These endodontically treated teeth were considered unrestorable after multiple failures of the crown and posts. A full-thickness flap is reflected, enabling visualization of the intact but very thin facial plate of bone.

Gentle but firm pressure on this facial bone with a periosteal elevator is maintained to stabilize forces during the tooth-removal process. Following careful extraction implementing the sequential instrumentation of periotope, X-Otome and forceps, debridement of residual PDL fibers is followed with placement of two 4.1 mm by 12.0 mm bone level implants (Straumann).

The patient was strongly opposed to wearing a temporary RPD following surgery. The risks and advantages to immediate temporization were presented. He was amenable to maintaining a soft diet for a few weeks after surgery. Therefore, this option was chosen to temporize the patient after surgery.

A screw-retained provisional bridge, free of occlusal contacts, is delivered. This temporary FPD is fabricated using a vacuum-formed template, also used as a surgical guide. The composite resin material is mechanically retained on to provisional abutments. Screw-retention is preferred rather than cementation to eliminate the adverse events associated with residual cement remaining after wound closure.

After placement of this temporary restoration and tightening to 15 Ncm, bone augmentation, both into the residual sockets and over the thin facial plate, is done with freeze-dried, allograft bone and a resorbable collagen membrane. The area is closed with resorbable, monofilament sutures. After 12 weeks of healing, a three-unit, ceramic FPD, cemented on two CAD/CAM (Etkon/Straumann) abutments is fabricated.

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About the author

Dr. Barry P. Levin is a diplomate of the American Board of Periodontology. He earned his DMD from Temple University School of Dental Medicine in 1994 and his certificate in periodontology from the University of Maryland School of Dental Surgery in 1996. Since then, Dr. Levin has maintained a private practice in Elkins Park, Pa., limited to periodontology and dental implant surgical therapy. He is a clinical associate professor at the University of Pennsylvania, in the graduate departments of periodontology and dental implant surgery. Dr. Levin lectures nationally and internationally on subjects pertaining to dental implantology, tissue regeneration and esthetics. He has published several articles and a textbook chapter and has been involved in clinical studies researching new implant designs and bone grafting procedures.

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