Introduction

When two-stage, root-form osseointegrated implants were first introduced, the techniques for using them were based on the assumption that implants would be placed into healed alveolar ridges. In the last 12-15 years, however, the concept of placing both two-stage and now one-stage implants into fresh extraction sites has excited the field of implant reconstruction.3-5

Immediate implant placement offers both the patient and clinician a number of benefits. Eliminating the post-extraction wait for primary healing of the soft tissues and regeneration of the osseous structure shortens the overall treatment time. Even when extraction is atraumatic, the absence of a functioning dental unit causes the bone to undergo a catabolic phase that results in varying degrees of atrophy. In contrast, placing the implant immediately after extraction preserves the bony receptor site as well as the surrounding soft tissue. Another benefit of immediate placement after extraction is that design and fabrication of the prosthesis typically are improved, resulting in better-finished lines and margins, heights of contour, emergence profiles, and interproximal architecture. Finally, since the extraction socket is totally visible, the surgeon can better determine the appropriate alignment and parallelism relative to the adjacent and opposing residual dentition. The result is a better implant position, which in turn ensures better final function and esthetics6 (Table 1).

This article presents clinical guidelines developed by the author for placing implants immediately following extraction. A case illustrating this technique is also described.

Table I

Benefits Of Immediate Implantation

- Improved prosthesis fabrication and/or design
  a. Finish line – Margins
  b. Height of Contour
  c. Emergence profile
  d. Interproximal architecture
- Consolidation of the number of procedures
- Reduction in time of treatment
- Preservation of the bony receptor site
- Preservation of soft tissue
- Easier determination of appropriate alignment and parallelism

Table II

Surgical Consideration For Extraction Immediate Implantation

- If acute infection, pre-op antibiotic therapy
- No purulent exudate at extraction
- Patient warned of possible staged or delayed procedure
- Surgeon’s decision, go or no go, at time of extraction
- Atraumatic surgical removal
  a. Section with hi-speed bur
  b. Periotome removal
  c. X-trac System
- Lingual/palatal line of preparation and insertion of implant 2.0 mm longer than root
- 2/3 of implant in contact with bony receptor site
- Implant must be immobilized at final placement
- Adequate soft-tissue closure

Table III

Consider Grafting Procedures

- If any osseous defect exists circumferentially
- If there is translucence of bur or implant on labial/buccal bone
- If there is residual exposure of the implant body
- If dehiscence or fenestration exists
- Primary closure of soft-tissue flaps
  a. Vertical relaxing incision
  b. Scoring of periosteum
  c. Water-tight closure no longer necessary
Methodology and Clinical Guidelines

From 1988 to 1993, the author placed 163 implants in fresh extraction sites in 80 patients. The male/female ratio among the patients was 2 to 1, and the average age was 59 years, +/- 14 years. Indications included single-tooth replacement, unilateral distal free-end, bilateral distal free-end, intermediary piers, and full-arch reconstruction in both the maxilla and the mandible. Only two implants failed. Life-table statistical analysis revealed a 96.4 percent five-year survival rate for this series of cases.

Based upon this experience, the following clinical surgical guidelines were developed:

Prior to all elective procedures, patients are thoroughly evaluated. Pre-operative evaluations are not always possible in acute situations such as those involving a fractured tooth that is non-restorable or has pulpal exposure.

Whenever there is evidence of an acute infectious process, antibiotic therapy is initiated two to three days prior to surgery.

Patients are informed pre-operatively that if any purulent exudate is discovered during the course of the surgery, the implant placement and/or grafting procedures will not be carried out but instead a delayed procedure will ensue. (Unless there is a fistulous track and/or exudate around the sulcus, this determination usually can only be made interoperatively.)

The procedure is typically initiated by reflecting the mucoperiosteal tissues and surgically removing the tooth asatraumatically as possible. The recent introduction of the X-Trac Extraction Systems® (A. Titan Instruments, Hamburg, New York) has made it possible in many instances to atraumatically remove the tooth in toto. When a tooth has previously been treated with endodontic therapy, however, it may be brittle or even ankylosed to the surrounding bone. In such cases, in order to best preserve the osseous receptor site, the author uses a high-speed, contra-angle handpiece with a 700 XXL bur to section the tooth longitudinally and dissect the segments, which are then removed with the aid of a Periotome.

When placing the implant, orienting the line of insertion off the palatal aspect of the extraction socket usually creates the best alignment of the implant in the arch. Doing this is especially important in the esthetic zone of the anterior maxilla. At least two-thirds of the implant should be in contact with the host bone at the receptor site. Wherever possible the implant should be 2.0 mm longer than the tooth socket. The implant should be totally immobilized in the site without the benefit of graft material. If the implant is not immobile, chances for osseointegration will be greatly diminished (Table II).

Whenever any osseous defect exists in proximity to the implant, grafting and/or the use of a barrier membrane should be considered. Grafting is also indicated when the labial or buccal bone is eggshell-thin or so thin that the implant and/or the burs can be seen through the bone or when an actual dehiscence exists. Such compromised areas are usually avascular. A bone graft will improve the vascular supply and prevent secondary dehiscence due to avascular necrosis. The use of resorbable barrier membranes may also be considered. Barrier membranes should be immobilized with fixation devices whenever possible (Table III).

Following these guidelines for extraction and immediate placement, the author has achieved excellent outcomes in more than 1,000 cases (Fig. 1).
Tapered Implants

Although excellent results can be obtained when placing standard implants in fresh extraction sites, tapered anatomically shaped implants are the implants of choice for this indication. Instead of having a uniform diameter, such implants more closely mimic the shape of the natural tooth roots (Fig. 2). They are wider at the cervix than at the apex. Tapered implants, such as the Camlog Root-Form Implant System (Sullivan Schein Inc., Melville, New York) are available in various lengths (9, 11, 13 and 16 mm) and surface diameters (3.8, 4.3, 5 and 6 mm). The Camlog Root-Form implants have a Promote blasted acid-etched surface. When used immediately after extraction, tapered implants offer a number of advantages. The larger cervical diameter provides better buccal support and helps preserve the root prominence, an important benefit in all implant reconstruction and especially so in the esthetic zone of the anterior maxilla. The larger cervical diameter also improves the implant-to-bone interface, which in turn enhances stability and creates a more acceptable emergence profile in relation to the final prosthesis. In many instances, the tapered design may obviate the need to use grafting materials or a membrane, thus helping reduce the cost of treatment. The incidence of fenestration and dehiscence are greatly reduced when using tapered implants as opposed to parallel-walled ones.

The tapered design also allows the implant to be placed in the same position as the extracted tooth and avoids the buccal or labial wall perforation common in the anterior maxilla when using parallel-walled implants. Perforation of the submandibular and digastric fossa in the mandible can similarly be avoided. Since the position of the implant is similar to that of the extracted tooth, restoration can be in a more favorable position relative to the opposing arch, thus reducing excessive off-axis loading on the implant. In addition, the tapered implant can be used in cases with convergent adjacent roots, where a parallel-walled implant would be contraindicated. By using a straight or 15-degree-maximum angled abutment for fixed prostheses, the occlusal table will have more acceptable buccolingual dimensions. These dimensions can also be achieved with screw-retained prostheses, if desired.

Figure 2 continued on page 28

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Case Review

This 55-year-old female patient was referred by her restorative dentist. She presented with a retained maxillary right deciduous cuspid. On radiographic review and clinical examination, it was determined that there was no permanent successor tooth (Figs. 3a and b). Subsequently the patient was treatment-planned for extraction of the retained deciduous cuspid and placement of an immediate implant with an immediate temporary abutment and provisional crown. The patient was taken to surgery. Under intravenous sedation and local anesthesia, an atraumatic surgical removal of the maxillary right deciduous cuspid was performed (Figs. 4a and b). Using the surgical protocol for Camlog Root-Form implants, a 3.8 x 16 mm implant was placed (Figs. 5-7). A healing abutment with parallel walls was also placed immediately instead of the surgical sealing screw. This gave the restorative dentist immediate access for placement of a temporary abutment.

Figure 3a
Pre-operative clinical view of the maxillary right deciduous retained tooth.

Figure 3b
The panoramic radiographic view shows the lack of a permanent successor for the deciduous tooth.

Figure 4a
Following extraction, the tooth’s length and diameter are measured to help guide the implant selection.

Figure 4b
The receptor site after the use of the 3.8 mm tapered bur.

Figure 5a
Tapered 3.8 mm diameter burs are used to initiate the receptor site preparation to a depth of 16 mm.

Figure 5b
A 3.8 x 16 mm Camlog implant, with the Promote surface, ready for insertion in the receptor site.

Figure 6a
The insertion instrument with ratchet arm. The dimple on the wrench aligns to the buccal surface, while simultaneously aligning the internal cam of the implant to the buccal.

Figure 6b
The implant in its final position with the insertion assembly still in position. Good parallelism can be seen.

Figure 7a
The internal aspect of the Camlog implant with the cam aligned to the buccal for proper orientation.
The patient was sent to the restorative dentist’s office where he removed the healing abutment and replaced it with a PEEK (polyether (acrylether) etherkethone hospital-grade plastic) temporary abutment. The provisional abutment was prepared appropriately, and a transitional crown of Perfectemp with a facial bonded composite was fabricated for maximum esthetics. It was cemented with Duralon (Figs. 8-10). The patient was allowed to heal, and the implant osseointegrated (Fig. 11). Approximately three
months later, the final restoration, a Procera crown, was fabricated and cemented with Improv over a custom gold abutment with a ceramic porcelain overlay (Figs. 12 and 13).

Conclusion
In the author’s experience, immediate placement of implants in fresh extraction sites has proven to be a beneficial treatment mode for hundreds of patients over the past 17 years. When clinical guidelines are followed for properly indicated cases, treatment time is shortened and excellent functional and esthetic results can be achieved.

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Dr. Babbsch has authored three textbooks, and a new book, As Good As New: A Consumers Guide to Dental Implants, dedicated to the education and orientation of the public to implant reconstruction.