

Immediate Implant Placement and Provisionalization in the Esthetic Zone Using the Patient's Tooth



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The maintenance and development of an esthetic hard and soft tissue complex becomes a prerequisite in implant therapy, particularly when treatment occurs in the esthetic zone.¹ An implant that is osseointegrated does not always translate into esthetic success.²

Recession following tooth removal in the anterior maxilla presents a unique restorative challenge for the practicing clinician. The objective following tooth removal is to maintain the hard and soft tissue architecture. The most difficult area is the papilla. Dentists must do everything possible to maintain the volume of tissue and prevent shrinkage.

The most effective way of maintaining the papilla and soft tissue height is to prevent its loss at the time of extraction. The gingival architecture must be maintained and supported immediately following extractions. This requires precise surgical technique without removing interproximal or facial bone. The extraction must be as atraumatic to the tissue as possible. Surgical flaps and incising of the papilla should not occur in the ideal situation.

Critical to the preservation of tissue height is to control the gingival embrasure at the time of extraction. If the embrasure space is not filled with a provisional that is equal in volume as the extracted tooth, the papilla and surrounding tissue will lack support, causing the gingival scallop to flatten and the interproximal papilla to recede.³

To select either immediate or postextraction implant placement, several factors have to be considered, including the anatomy of the extraction site, the surgical procedure, duration of treatment required, and the esthetic result.

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Abstract

The esthetic demands of patients are challenging dentists to achieve beautiful smiles in shorter treatment times. Patients no longer want to go without teeth or wear removable appliances for long periods of time. The immediate implant placement and provisionalization can provide predictable results and decrease treatment time. This type of treatment is no longer in the experimental phase and will become the standard of care in the future.

Learning Objectives

After reading this article, the reader should be able to:

- Explain the advantages of immediate implant placement and provisionalization.
- Discuss which tissue type is ideal for this treatment.
- Summarize how to provisionalize to preserve tissue height.

implant placement procedure depends on the primary stability of the implant, attained by drilling the bone beyond the extraction site. It is not early loading that creates the effect of fibrous encapsulation, but rather micromovements at the bone-implant interface, resulting from inadequate primary stability.⁴

Numerous studies have indicated that immediate placement of an implant in an extraction site is as successful as delayed or staged implant placement in a healed and mature bony site, with the additional advantage of a shorter treatment time.⁵ Before extraction of the tooth, the gingival form and bony architecture must be evaluated. If the tissue and bone is acceptable, then the objective is to preserve as much of the original form

as possible. If there is facial bone loss, a degree of recession can be expected. The bone is needed to maintain and support the overlying tissue. Additional treatment may be necessary at the time of extraction, which may include bone grafting.⁶ The predictability of treatment is also influenced by the thickness of the periodontium, as thicker tissues have a reduced tendency to recede.

This article presents a technique to minimize the duration of treatment time and to preserve the hard and soft tissue contour. This procedure also eliminates the necessity of a removable provisional prosthesis by immediate placement and provisionalization of a single-stage implant in the anterior maxilla, using the patient's extracted tooth. Although a removable partial

denture also can be used as a provisional restoration, there is greater risk of affecting tissue changes resulting from movement of the prosthesis.

The technique described cannot be used in all situations. If there is not adequate bone available, a graft and a two-stage approach should be used. Primary stability of the implant is imperative at time of placement. Micromovement will cause the implant to fail. The patient is instructed not to use any occlusal force on the provisional.

Case Presentation

A 40-year-old man presented with discoloration and severe discomfort of his right central incisor (Figure 1). The patient had a traumatic blow to the tooth 20 years earlier. Upon consultation with an endodontist, it was determined that the tooth had a questionable prognosis for long-term success. The patient was given several treatment options, including a fixed partial denture, removable appliance, or a single-tooth implant restoration. The patient opted for a single-tooth implant restoration.

Examination, both clinically and radiographically, revealed no periapical radiolucency or signs of active infection. Probing depths were within normal limits. The patient was informed that possible modifications to the tissue may be necessary if there were significant gingival changes following surgery. The patient presented with an ideal tissue type—thick with excellent bony support.

Surgical Procedure

Local anesthetic was administered, and periostomes were used to loosen the periodontal ligament. The tooth was atraumatically removed without reflecting a flap. According to the manufacturer, the implant was placed, using a surgical guide fabricated on a drill press and surveyor.

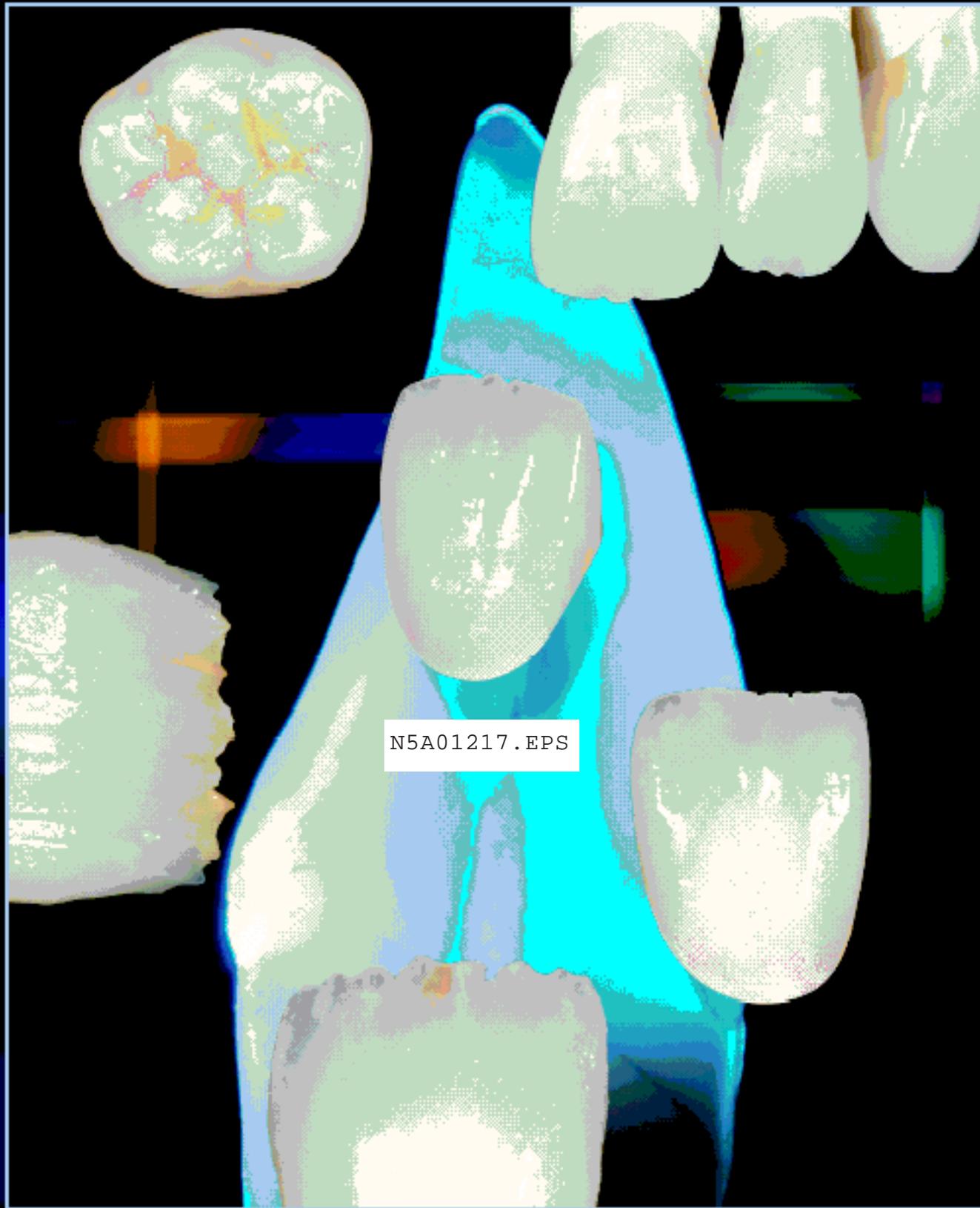


Figure 1—A 40-year-old man presented with discoloration and severe discomfort of his right central incisor.



Figure 2—A Straumann standard diameter 4.1-mm implant with a 4.8-mm collar was inserted and Bio-Oss was placed around the implant.

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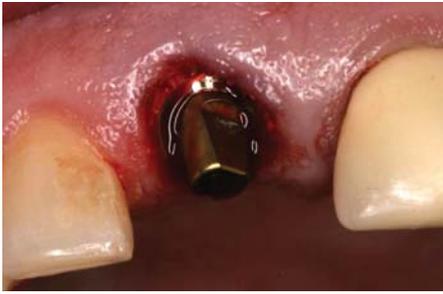


Figure 3—A Straumann 4.0-mm solid screw abutment was placed and hand-torqued.



Figure 4—The root was sectioned horizontally with a diamond bur, 3 mm from the cemento-enamel junction.



Figure 5—The tooth was hollowed-out to fit over the abutment and was tried-in to make sure it would fit accurately.



Figure 6—After confirming an accurate fit, the tooth was etched for 30 seconds.

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A Straumann standard diameter 4.1-mm implant (Institut Straumann AG; US Distributor, Straumann USA) with a 4.8-mm collar was inserted, and Bio-Oss (Osteohealth Company), a naturally porous bone-grafting material, was placed around the implant (Figure 2). Stability was achieved by engaging bone beyond the extraction socket. A minimum distance of 1.5 mm was maintained between the implant and adjacent teeth to minimize marginal bone loss as a result of the encroachment of the lateral biologic width.⁷⁻⁹

Abutment Placement

A Straumann 4.0-mm solid screw abutment (Institut Straumann AG; US Distributor, Straumann USA) was placed and hand-torqued, being careful not to turn the implant (Figure 3). No preparation was necessary because this is a stock component, and the occlusion did not interfere.

Provisionalization

The patient's extracted tooth would serve as the provisional restoration, while healing occurred. The root was sectioned horizontally with a diamond bur, 3 mm from the cemento-enamel junction (CEJ) (Figure 4). The tooth was hollowed-out to fit over the abutment (Figure 5) and was tried-in to make sure it would fit accurately. After confirming an accurate fit, the tooth was etched for 30 seconds (Figure 6). A bonding agent was applied and light-cured 20 seconds (Figure 7). A bis-Acryl material (Temptation or Luxatemp, Zenith Dental Products) was injected into the tooth (Figure 8). The tooth was then placed on the abutment and allowed to fully polymerize for 2 minutes (Figure 9). Flash was removed, using discs and carbide finishing burs. The final relines after it



Figure 7—A bonding agent was applied and light-cured 20 seconds.



Figure 8—A bis-Acryl material was injected into the tooth.



Figure 9—The tooth was then placed on the abutment and allowed to fully polymerize for 2 minutes.



Figure 10—The final reline after it was polished.

was polished is shown in Figure 10.

The postoperative radiograph confirms a very accurate fit (Figure 11). This mimics the preoperative radiograph very closely (Figure 12).

A thin layer of Zone temporary cement (Dux Dental) (Figure 13) was applied to the inner surface and placed on the abutment (Figure 14). Care was taken to minimize overfilling the restoration. Excess cement was easily removed after its initial set.

Interproximal support should be carefully achieved. The tooth was taken out of occlusion and there were no contacts in centric or excursive movements. The tooth on the day of surgery is shown in Figure 15.

It is important to have a flat emergence profile on the facial to help decrease tissue recession.

The patient was advised against using the surgical site and that care should be taken when performing oral hygiene. After 8 weeks of healing, the patient returned for a tissue check. The free gingival margin maintained itself, without recession (Figure 16). Now the tissue is healed, the placement of the final restoration can begin.

Conclusion

Clearly, immediate implantation in extraction sites can no longer be considered an experimental technique. When indicated, immediate implant placement and provisionalization after an extraction enables the maintenance of

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Figure 11—The postoperative radiograph confirms a very accurate fit.



Figure 12—This mimics the preoperative radiograph very closely.



Figures 13 and 14—A thin layer of Zone temporary cement was applied to the inner surface and placed on the abutment.



Figure 15—The tooth on the day of surgery.



Figure 16—The free gingival margin maintained itself, without recession.

esthetics and phonetics during the healing phase.

Immediate implant placement has been advocated since 1989 to preserve the height and width of the alveolar bone.¹⁰ Several steps must be followed to achieve esthetic results on a consistent basis. The tooth must be atraumatically removed, and preservation of the labial bony plate is vital to the success of the technique. Patients with thick and flat gingival architecture are better candidates for this treatment. Thin and highly scalloped gingiva has more of a tendency to

recede. Although flapless surgery may minimize bone loss, its lack of visibility may present limitations that require careful evaluation and meticulous surgical execution. The natural tooth provides the optimum shape and size to support the peri-implant mucosa, and maintain the papillary height, and gingival outline and form throughout the osseointegration period. ■

Acknowledgment

The author would like to thank oral surgeon John Maletta, DDS, for his surgical expertise in this case.

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Product References

Products: Straumann standard diameter 4.1-mm implant, Straumann 4.0-mm solid screw abutment
Manufacturer: Institut Straumann AG
Distributor: Straumann USA
Address: 1601 Trapelo Rd. Waltham, MA 02451
Phone: 800.448.8168
Fax: 781.890.6464

Product: Bio-Oss
Manufacturer: Osteohealth Company
Address: 1 Luitpold Dr. PO Box 9001 Shirley, NY 11967
Phone: 800.874.2334
Fax: 631.924.9243

Products: Temptation, Luxatemp
Manufacturer: Zenith Dental Products
Address: 242 South Dean St. Englewood, NJ 07631
Phone: 800.662.6383
Fax: 201.894.0213

Product: Zone temporary cement
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1. The most difficult area is the:
 - a. Papilla.
 - b. Oral mucosal.
 - c. Unattached gingiva.
 - d. Attached gingiva.
2. The most effective way of maintaining the papilla and soft tissue height is to:
 - a. Inject it with epinephrine.
 - b. Inject it with collagen.
 - c. Prevent its loss at the time of extraction.
 - d. Use vertical releasing incisions.
3. The success of the immediate implant placement procedure depends on:
 - a. Maintaining a sterile operating field.
 - b. Primary stability of the implant.
 - c. Waiting before loading the implant.
 - d. Using the smallest implant possible.
4. What creates the effect of the fibrous encapsulation?
 - a. Eccentric occlusal contacts
 - b. Centric occlusal contacts
 - c. Micromovements
 - d. Early loading
5. While a removable partial denture can be used as a provisional restoration, there is a greater risk of affecting tissue changes because of:
 - a. Improper clasp designs.
 - b. The movement of the prosthesis.
 - c. Poor quality rest seats.
 - d. Abnormal path of insertion.
6. What minimum distance was maintained between the implant and the adjacent teeth?
 - a. 0.5 mm
 - b. 1 mm
 - c. 1.5 mm
 - d. 2 mm
7. The tooth was hollowed-out to:
 - a. Fit over the abutment.
 - b. Alter the internal shade of dentin.
 - c. Change the refractive index of enamel.
 - d. Decrease the desiccation of the tooth.
8. It is important to have a flat emergence profile on the:
 - a. Apical.
 - b. Coronal.
 - c. Lingual.
 - d. Facial.
9. Which gingiva has more of a tendency to recede?
 - a. Thin and flat
 - b. Thin and highly scalloped
 - c. Thick and flat
 - d. Thick and highly scalloped
10. What provides the optimum shape and size to support the peri-implant mucosa?
 - a. Custom implants
 - b. The natural tooth
 - c. Narrow implants
 - d. Wide implants.

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