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The World's Dental Implant Newspaper · U.S. Edition

SEPTEMBER 2010 www.implant-tribune.com VOL. 5, NO. 9

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(Photo/Provided by Dr. Steven A. Guttenberg)

CBCT and implants: a career-altering experience

By Steven A. Guttenberg, DDS, MD

With all the technology available to dental practitioners today, very few can be described as "career altering." One of my original reasons for investing in a cone-beam computed tomography (CBCT) scanner was to assist with the complete evaluation of dental implant sites.

A major concern during implant placement is the possibility of placing an implant too close to or penetrating the inferior alveolar nerve canal, likely resulting in injuries such as paresthesia, anesthesia or dysesthesia. In preparation for the insertion of fixtures, I wanted to be able to appropriately visualize important anatomic landmarks

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Esthetic management of adjacent maxillary central incisors

Extraction, immediate placement and immediate provisionalization

By Michael Sonick DMD

Periodontist: Dr. Michael Sonick
Restorative Dentist: Dr. Patrice Foudy

Patient history

A medically and periodontally stable 50-year old woman presented with failing #8 and #9 teeth that exhibit asymmetry, lack of interdental papilla and a history of failing root-canal therapy and apicoectomy (Fig. 1).

Treatment plan

1. Extraction of teeth #8 and #9, immediate implantation of #8 and #9 and immediate non-functional provisionalization of #8 and #9.
2. Three-month healing period.
3. Gingivectomy to create mucosal symmetry.
4. Six-month healing period, during which contour adjustments to interim restoration will be made to manipulate papillary regeneration.
5. Placement of final single PFM crowns on implants #8 and #9.

Treatment plan rationale

Implant rehabilitation for sites #8 and #9 boosts long-term prosthetic success, which diminishes future costs and permits more future restorability options.

Fig. 1a: Initial facial view. (Photos/ Provided by Dr. Michael Sonick)

The patient is an ideal candidate for immediate implant placement and temporization because of her thick biotype, which resists recession, as well as the inherent coronal positioning of the gingival drape around #8 and #9 compared to the adjacent teeth, which allows any minor recession post-treatment to remain within esthetically pleasing bounds.

Extraction of teeth #8 and #9, immediate placement of implants #8 and #9 and immediate non-functional provisionalization of #8 and #9

After oral sedation with 0.25 mg triazolam and local anesthetic induction using 2 percent lidocaine with 1:100,000 epinephrine and 0.5 percent bupivacaine with 1:200,000 epinephrine, sulcular incisions were made circumferentially around teeth #8 and #9.

To create room for extraction instructions, the crowns on teeth #8 and #9 were reduced (Fig. 2a). Teeth #8 and #9 were extracted atraumatically using a piezosurgical insert and serrated universal maxillary forceps

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(Figs. 2b-2c). Degranulation of the sockets was performed using a carbide finishing bur and Neumeyer bur.

A surgical guide was used to prepare the implant osteotomies, and proper positioning was attained (Fig. 3). After finalization of the osteotomy sites, rough-surfaced, internal hex 4 mm (diameter) x 13 mm (length) implants were placed into the #8 and #9 sites (NanoTite® Tapered Certain® Implant, BIOMET 3i, Palm Beach Gardens, Fla.) (Fig. 4).

Healing abutments were placed on the implants to prevent soft-tissue and bony collapse during the period that extraoral fabrication of the temporary prostheses occurred (Fig. 5a).

The orientation of the implants was ideal, and the fixtures exited from the sockets at the cingulum positions (Fig. 5a). Primary stability was achieved. Radiographic review of the implants revealed a peak of bone between the fixtures, an inter-implant distance of greater than 4 mm and an implant-tooth distance of 2 mm (Fig. 5b). To bridge the circumferential gap between the socket walls and the implant surfaces, freeze-dried bone allograft (FDBA) was used as graft material (LifeNet Health, Virginia Beach, Va.).

Temporary cylinders (PreFormance® Temporary Cylinder, Certain Internal Connection, 4.1 mm platform, hexed) were placed on the implants to check the restorative position (Fig. 6). These were removed, and an implant-level pick-up impression was taken.

After chairside creation of a cast

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Fig. 1b: Smile view. Lack of papillae between #8 and #9 is evident. Patient also reveals gingival asymmetry, inflammation and excess gingiva around #8 and #9.

Fig. 1c: Right lateral initial smile view.

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with implant analogs, the hexed temporary cylinders were connected to the analogs and acrylic resin interim crowns were fabricated using a vacuum-formed template made over ideally shaped central incisors.

The resin interim crowns were seated and screwed onto the implants using hexed titanium screws with 20 Ncm torque. Cotton pellets were placed over the screw heads, and the access holes were sealed with composite resin.

Occlusal adjustment prevented functional contact upon excursions. The interim restorations did not fill the papillary space between #8 and #9 (Fig. 7). A radiograph taken following completion of provisionalization demonstrated satisfactory positioning and seating (Fig. 8).

Gingivectomy over implants #8 and #9

Healing of the implant sites proceeded without incident. At one week post-surgery, the buccal marginal tissue remained coronally-oriented and encroachment of the papilla into the unfilled interdental space began (Fig. 9). Three months after initial surgery, further coronal displacement and papilla fill occurred

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Fig. 1d: Left lateral initial smile view. Teeth #8 and #9 appear to be on a different occlusal plane. Attention is drawn to them.

Fig. 2a: Contact points are broken and the crowns are removed. Trauma to the bone and adjacent teeth is to be avoided.

Fig. 2b: Following a sulcular incision, piezosurgery is used to atraumatically remove the teeth.

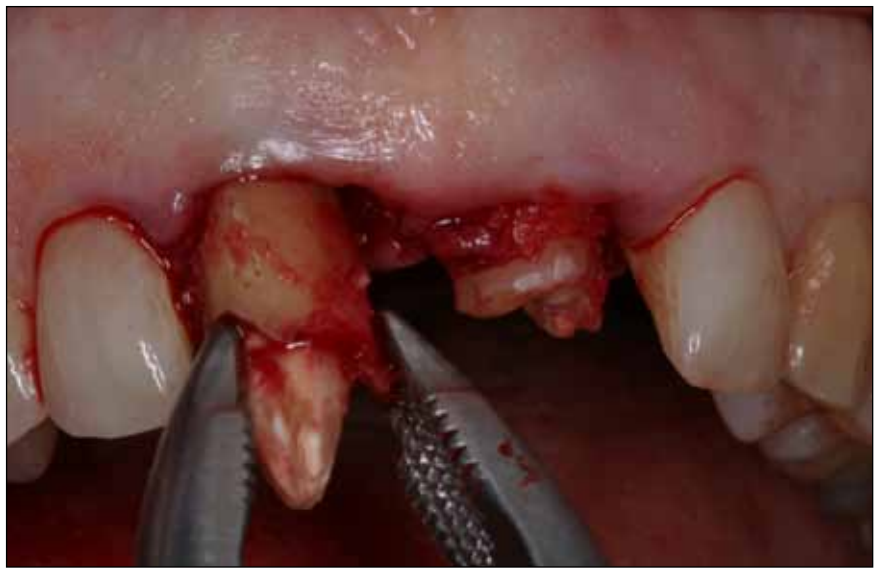

Fig. 2c: Utilizing beaked serrated forceps and rotational apical pressure, tooth #8 is removed without any destruction to the alveolar plate.

Fig. 1e: Initial radiograph. Teeth #8 and #9 are failing endodontically.

Fig. 3a: A surgical guide is used to ensure correct orientation during osteotomy preparation. Buccal view of the guide in place with orientation pins is shown.

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1 Porter JA, et al. Comparison of load distribution for implant overdenture attachments. *Int J Oral Maxillofac Implants*. 2002;17(5):651-662.

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(Fig. 10).

Minor gingivectomy was performed to create mucosal symmetry between the maxillary central incisors. The contact point and contour of the interim crowns were also adjusted to create a fuller papilla.

Final restoration of implants #8 and #9

Six months after gingivectomy and provisional contour modification, the implants were ready for final prostheses (Fig. 11). Single final PFM crowns were placed on implants #8 and #9. Clinical analysis demonstrated resolution of inflammation,

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Fig. 3b: Occlusal view of the surgical guide in place. Note that the osteotomy is located at the cingulum position, the preferred site for a screw-retained restoration. Notice too the occlusal wings on the guide that stabilize its position on adjacent teeth during surgical preparation.

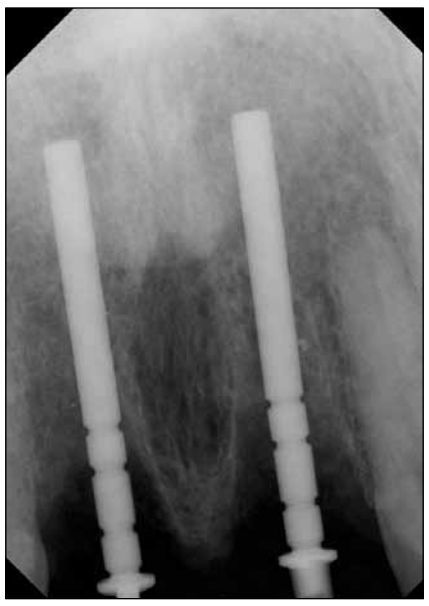

Fig. 3c: Initial osteotomy orientation confirmed by radiograph.

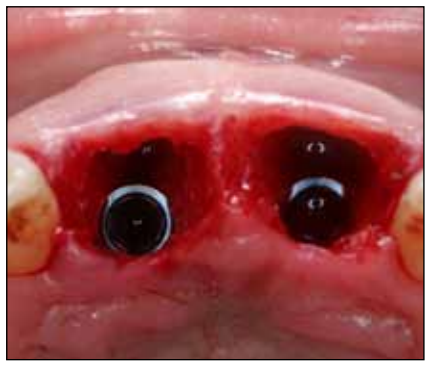

Fig. 4: Occlusal view following placement of two 4 mm-diameter dental implants. Note the palatal position and the thickness of the buccal plate. A gap is present between the labial aspect of the implant and the facial plate. This will be grafted.

Fig. 5a: Temporary healing abutments in place. They prevent soft-tissue and bony collapse while the provisional restoration is being fabricated extra-orally.

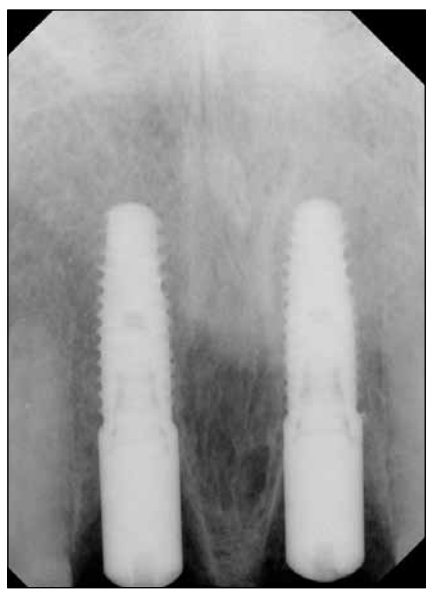

Fig. 5b: Radiograph of implants in place with temporary healing abutments. Note peak of bone between the implants.

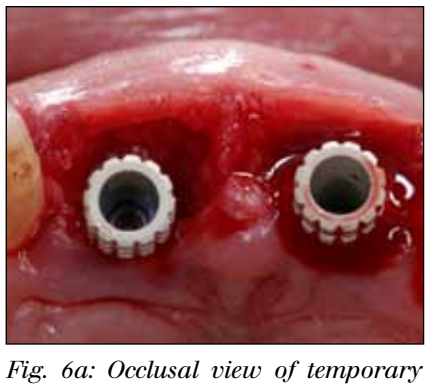

Fig. 6a: Occlusal view of temporary cylinders. Note ideal positioning for both function and esthetics. Occlusal forces are directed along the long axis of the implants. Implants are also positioned palatally, which will allow for ideal sculpting of the tissue with the provisional.

PRESERVE BONY ARCHITECTURE IN COMPROMISED

EXTRACTION SITES

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Extraction sites with deficient structural support (ex. buccal defects) often require ***tenting membranes to prevent collapse into the defect***. In these cases, titanium-reinforced membranes help reshape the site to the original dimensions of the ridge. Although primary closure may be obtained, Cytoplast® titanium-reinforced membranes are designed to withstand exposure and prevent bacterial penetration[1, 2, 3], making them especially well-suited for extraction site reconstruction.

1. Fotek PD, Neiva RF, Wang HL. Comparison of dermal matrix and Polytetrafluoroethylene membrane for socket bone augmentation. J Periodontol 2009;80:776-785 **2**. Hoffman O, Bartee BK, Beaumont C, Kasaj A, Deli G, Zafiropoulos GG. Alveolar bone preservation in extraction sockets using non-resorbable dPTFE membranes: A retrospective non-randomized study. J Periodontol 2008;79:1355-1369 **3**. Barber HD, Lingnelli J, Smith BM, Bartee BK. Using a dense PTFE membrane without primary closure to achieve bone and tissue regeneration. J Oral Maxillofac Surg 2007;65:748-752

Due to a vertical root fracture, the entire buccal plate is missing. The titanium-reinforcement of the Cytoplast® Ti-250 Anterior Narrow allows easy placement and maintenance of space.

The dense PTFE membrane has a pore size of <0.3µm, making it occlusive to both soft tissue cells AND bacteria. Primary closure is not necessary.

At two weeks, healing over the membrane is excellent – no inflammatory response and infection-free.

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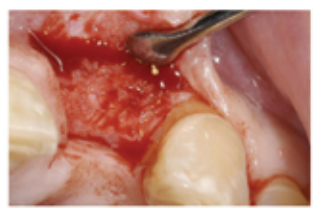
Two weeks after removal of the membrane, soft tissue has re-epithelialized over the socket. Soft tissue contours are preserved.



Re-entry at 4 months shows regeneration of the ridge to its original dimensions. Implants may now be placed in an optimal location.

Extraction Site Grafting Configurations

Shown actual size.

12 mm x 20 mm

Cytoplast® Ti-250 Anterior Narrow

Ideal for narrow single-tooth extraction sites, especially where one or more bony walls are missing.

14 mm x 24 mm

Cytoplast® Ti-250 Anterior Singles

Ideal for single-tooth extraction sites, especially where one or more bony walls are missing.

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Fig. 6b: Facial view of temporary cylinders.

Fig. 7: Provisional restoration immediately following reline and placement. Papilla is not present.

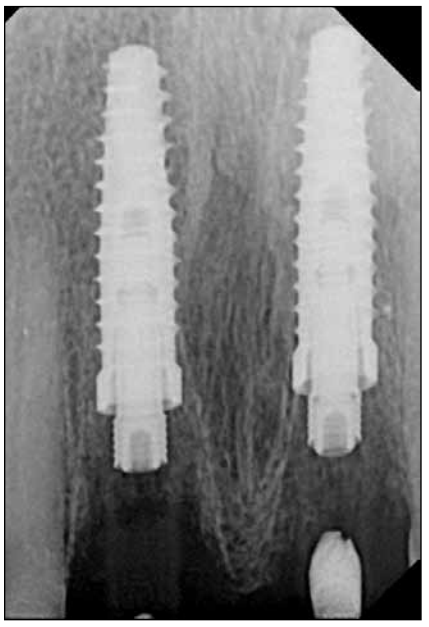

Fig. 8: Radiograph the day of implant placement.

Fig. 9: Provisional restoration one week post-implantation. Very good soft-tissue healing and minimal recession.

Fig. 10: Provisional restoration three months post-implantation.

Fig. 11: Provisional restoration at six months after gingivectomy and adjustment of interim crown contours.

Fig. 12a: Final #8 and #9 implant restorations.

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idealization of the soft-tissue drape and papillary regeneration (Fig. 12).

A radiograph illustrated preservation of interproximal and periimplant bone (Fig. 13). The patient was satisfied with the functional and esthetic results (Fig. 14).

Post-operative instructions

After each surgical procedure, the patient was instructed to take ibuprofen 600 mg q4-6 hours, hydrocodone 7.5 mg/acetaminophen 750 mg q4-6 hours prn pain and doxycycline

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Fig. 12b: Close-up view of final restoration.

Fig. 12c: Right lateral final view.