Esthetic management of a single dental implant in the esthetic zone

By Michael Sonick, DMD

A medically and periodontally stable 37-year-old man presented with coronally fractured tooth #9, which had a history of endodontic treatment (Figs. 1a, 1b). The tooth was deemed restoratively hopeless.

Treatment plan
1. Extraction of tooth #9 and socket preservation
2. Three-month healing period
3. Placement of implant #9 and connective tissue graft
4. Three-month healing period
5. Implant #9 exposure, placement of healing abutment and connective tissue graft
6. Three-month healing period
7. Final implant #9 crown restoration

Extraction and socket preservation of tooth #9
After oral sedation with 0.25 mg triazolam one hour prior to surgery and local anesthetic induction using 2 percent lidocaine with 1:100,000 epinephrine and 0.5 percent bupivacaine with 1:200,000 epinephrine, a sulcular incision was made circumferentially around tooth #9. The remaining root was extracted atraumatically using a piezoelectric periosteal device (Fig. 2).

Thorough degranulation of the extraction site with a pear-shaped carbide finishing bur and Prichard curette proceeded. No dehiscence or fenestration was detected. Freeze-dried bone allograft (FDBA) was used to obliterate the extraction socket. A bioabsorbable collagen plug (CollaPlug®, Zimmer Dental, Carlsbad, Calif.) was used to cover the graft. The area was secured using 4-0 expanded polytetrafluoroethylene (ePTFE) suture (Fig. 3). The restorative dentist temporized space #9 with an interim removable partial denture.

Fig. 1a, left: Hopelessly fractured tooth #9.
Fig. 1b, below: Periapical radiograph of endodontically treated tooth #9

(Clinical photos/Provided by Dr. Michael Sonick)
World dental implant and bone graft market to top $4.5B by 2012

Global sales of dental implant systems, fast becoming the preferred restoration for replacement of missing or extracted teeth or as supports for dentures, crowns and bridges, are expected to maintain double-digit growth during the next five years, soaring to more than $4.5 billion, according to “Implant-Based Dental Reconstruction: The Worldwide Dental Implant and Bone Graft Market,” second edition, a new study released from Kalorama Information.

Sales of dental implants and abutments rose more than 15 percent in 2006 alone reaching nearly $82 billion, led by Europe, where the popularity of implants saw sales peaking at $760 million or 42 percent of the global market.

Advanced bone grafting and regeneration techniques have radically expanded the possibilities for implant-based restorative dentistry. World sales of dental bone grafts reached $150 million in 2006, up 12 percent from 2005.

The report projects the use of bone grafts will more than double by 2012 with revenues reaching $226 million.

Grafting techniques are making it possible to expand the candidate pool for implants to include a sizable population of edentulous patients who were poor candidates for dental implantation due to severe bone resorption.

The most closely watched research and development projects in dental bone grafting today involve bone morphogenic protein (BMP) products,” noted Anne Anscomb, the report’s author.

“BMPs have the potential to transform the bone grafting market and surpass all other products on the market including synthetic substitutes, allografts, and demineralized bone matrices. With the announcement in March that the FDA approved Medtronic’s Infuse Bone Graft for certain oral maxillofacial and dental regenerative bone grafting procedures, the future of BMP and increased use of grafts and implants looks very promising,”

Implant-based dental reconstruction includes revenue forecasts for each segment through 2016, global market share for four geographic regions, more than 35 tables and figures with detailed market data, reviews of new products, and computer-aided dentistry and reimbursement trends.

It can be purchased directly from Kalorama Information by visiting www.kaloramainformation.com/Implant-Based-Dental-1399457. It is also available at MarketResearch.com.

Cadent iTero added to curriculum at LVI

Cadent, a leading provider of 3-D digital and CAD/CAM solutions, recently announced it has signed an agreement with the Las Vegas Institute for Advanced Dental Studies (LVI), one of the world’s premier post-graduate dental training facilities; where the iTero digital impression system will become the exclusive digital impression technology that will be utilized by all LVI students attending the programs to provide training and hands-on support for LVI students to obtain live case experience working with the iTero system.

Along with Cadent, the LVI partner laboratories (The Aurum Group, DTI MicroDental, Las Vegas Esthetics and Ovals Dental Lab) will provide the comprehensive prosthetic case development from the iTero digital impressions.

“The integration of iTero into the LVI curriculum supports our expanding network of educational opportunities for new and existing iTero dentists,” said Timothy Mack, president and chief executive officer of Cadent.

“Cadent recently completed its 2.5 millionth 3-D dental case for restorative dentists and orthodontists, a record of proven success which is required even to earn recognition by the faculty at the LVI. We are especially pleased that iTero has been deemed worthy of a partnership with LVI, a world-class organization that provides dentists with the continuing education needed to further develop their restorative dentistry practice."

“The inclusion of the iTero digital impression system supports LVI’s ongoing efforts to integrate the best of dentistry’s technological advances into the iTero digital curriculum,” said William G. Dickerson, DDS, founder and chief executive officer of LVI. “The era of digital dentistry has arrived and the addition of iTero to our programs will enable LVI students to become proficient in the industry’s most successful digital impression system.”

iTero serves more than 1,700 dentists in 12 countries, and is the only digital impression technology that does not require powdering or coating of the teeth, enabling the processing of more complex cases than any other system. [ ]

(Sources: Cadent)
A Bone Matrix Product Containing Stem Cells.

The Properties of Autograft without Associated Risks

The proprietary processing technology that produces Osteocel® results in a viable bone matrix product that preserves the native stem cells found in marrow rich bone. It is the only product available today that has the desired beneficial properties of autograft - osteoconduction, osteoinduction and osteogenesis — and that allows surgeons to provide their patients with optimal bone growth conditions without the added risk and cost of a secondary procedure.

Low Immunogenicity

Mesenchymal stem cells are IMMUNE-PRIVILEGED cells that do not stimulate a cellular immune response. Osteocel does not activate T cell proliferation, as shown in vitro from Mixed Lymphocyte Reaction (MLR) testing.

Histologic Evidence

Positive clinical use of Osteocel since 2005 demonstrates bone-forming ability. Histology from a human sinus augmentation study using Osteocel shows substantial vital bone content at 16 weeks, with very low residual graft material.¹

Bone Formation

Stem cells contained in Osteocel are capable of differentiating into bone cells. Every lot of Osteocel is tested for bone forming potential.

Viable Cell Content

The osteogenic potential arises from the stem cells in Osteocel. Following processing of marrow-rich bone, release testing demonstrates osteogenic potential according to the following criteria:

- Rich supply of stem cells: Greater than 50,000 cells/cc
- Viability: Greater than 70% cell viability
- Positive osteogenesis: In vitro cell culture assay

denture.

After three months of uneventful healing (Fig. 4), Stage 1 implant placement was initiated.

**#9 fixture placement and connective tissue graft**

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, a flap was created using a trapezoidal papilla-sparing incision design that involved a palatally oriented crestal incision over the #9 site with two vertical releasing incisions made on the buccal, both avoiding the mesial and distal papillae.

A full-thickness flap was raised past the mucogingival junction. Debridement of the site with a pear-shaped carbide finishing bur and Neumeyer bur revealed adequate apico-coronal, bucco-lingual and mesio-distal dimensions for implant placement.

After osteotomy preparation, a rough-surfaced, internal hex 4 mm (diameter) by 13 mm (length) implant was placed into the filled site (NanoTite® Parallel Walled Certain® Implant, BIOMET 3i, Palm Beach Gardens, Fla.) (Fig. 5).

Primary stability was achieved, and a cover screw was placed.

In order to form an aesthetic soft-tissue profile by expanding mucosal dimensions, a connective tissue graft was harvested from the palate and placed on the buccal aspect of the ridge overlying the implant. The graft was stabilized using 5-0 chromic gut sutures (Fig. 6).

After periosteal release via lateral scalpel incisions, the flap was primarily closed with 4-0 ePTFE sutures in an interrupted and horizontal mattress fashion (Fig. 7). The area was re-temporized with a resin-bonded fixed partial denture.

**Implant exposure with connective tissue graft**

The #9 site healed well and without incident after three months (Fig. 8). After using a tissue punch technique to remove the mucosa immediately coronal to the fixture (Fig. 9), a one-piece 4.1 mm (platform) by 5 mm (emergence profile) by 4 mm...
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Photo Credit: Richard Nowitz

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A healing abutment (Certain® EP® Healing Abutment, BIOMET 3i, Palm Beach Gardens, Fla.) was placed on the #9 implant.

To further augment the buccal ridge dimension, another connective tissue graft was harvested from the palate. A pouch-like envelope flap was raised over the labial ridge aspect into which the connective tissue was transplanted and fixed using 5-0 chromic gut suture (Fig. 10). The healing abutment remained exposed.

A periapical radiograph revealed sufficient bone height around the fixture at time of exposure. Note the favorable bone height.

Fig. 6: Connective tissue graft secured in place over the buccal ridge.

Fig. 7: Primary closure of grafted implant site.

Fig. 8: Healing three months post-implant placement. Note the favorable position of the mucosal margin.

Fig. 9: Exposure of the #9 implant using a tissue-punch technique.

Fig. 10a: Soft-tissue graft inserted into the buccal pouch.

Fig. 10b: Placement of the healing abutment on the #9 implant.

Fig. 10c: Buccal view of site with graft in place.

Fig. 11: Periapical radiograph of fixture at time of exposure. Note the favorable bone height.

Figs. 12a–12c: View of final restoration.
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fixture (Fig. 11). The resin-bonded fixed partial denture was replaced.

Final prosthetics
Final restoration of the #9 implant was performed three months post-exposure (Fig. 12). The marginal height and contour of the #9 implant crown matched that of adjacent tooth #8, and a periapical radiograph showed suitable peri-implant bone height (Fig. 17). The patient was satisfied with the functional and esthetic result (Fig. 14).

Postoperative instructions
After each surgical procedure, the patient was instructed to take ibuprofen 600 mg every 4-6 hours, hydrocodone 7.5 mg/acetaminophen 750 mg every 4-6 hours for pain and doxycycline 100 mg qd for 10 days. The patient was instructed not to brush at or near the surgical site but instead to rinse with 0.12 percent chlorhexidine or warm saline twice daily. The patient was also directed not to chew in the affected area for at least two weeks. Suture removal occurred at 10 to 14 days post-surgery.

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**About the author**

Dr. Michael Sonick is a full-time practicing periodontist and implant surgeon in Fairfield, Conn. A renowned educator, author and clinical researcher, he is a guest lecturer for the International Dental Program at New York University School of Dentistry, a former clinical assistant professor in the Department of Surgery at Yale University School of Medicine and University of Connecticut School of Dental Medicine, and a frequent lecturer on periodontics, dental implants and practice management for educational programs around the world. He is the founder and director of the Fairfield County Dental Club, an advanced continuing education organization that provides courses on the latest developments in dentistry to clinicians and their staff. Sonick is also founder and director of Sonick Seminars, a multidisciplinary teaching institute located in his clinical office and teaching center. Interested participants can contact Carole at (203) 254-2006 or visit the Web site at www.sonickdmd.com

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- Tapered apex allows for easier implant installation in all indications
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In more than 40 published articles*, the mean marginal bone level reduction when using the Astra Tech Implant System™ is only 0.3 mm during the first year of loading and stable thereafter. This result is at least four times better compared to the current standard norm of 1.5 mm of bone loss after five years.

*References available upon request.
Scenes from the AO in Orlando

The Academy of Osseointegration hosted its annual meeting March 4–6

Astra Tech develops, manufactures, markets dental implants and advanced disposable products for use within healthcare. The company develops products that enhance treatment results, simplify work for dental professionals and help cut healthcare costs.

KAT Implants is a manufacturer and distributor of KAT (Key Assisted Transfer) Implants® system. KAT System is built around a single low-profile screwless external locking taper connection platform, which allows the same abutments to be used on implants ranging in diameter from 2.5 to 5.0 mm and in length from 6 to 14 mm. The use of abutment incorporated key and a Pick-Up Abutment” impression method allow for an extremely accurate implant level indexing. For more information, see www.katimplants.com.

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From left, Dr. George Romanos, Implant Tribune Editor in Chief Sascha Jovanoic and Dr. Lyndon Cooper.

Piezosurgery Incorporated is the exclusive importer and distributor of the patented Piezosurgery® technology in the United States and Canada. Dedicated to customer service, quality products and innovative solutions in osseous surgery; Piezosurgery Incorporated is proud to be first in ultrasonic bone surgery. (Photo/Provided by Piezosurgery)
Springtime in New Orleans is a very special season. The oppressive heat and humidity that grips this Southern city has yet to be felt. The carnival atmosphere of Mardi Gras is a distant memory in the French Quarter and the citizenry that seems to thrive on gaiety and laughter is ready for its next "party."

Enter the world famous New Orleans Heritage Jazz Festival (better known as Jazz Fest), two weeks of the best jazz, rhythm and blues, pop and otherwise great music this country has produced. From April 24–May 2, the Big Easy will be hosting hundreds of musical acts as it celebrates its heritage: jazz.

Names like Wynton Marsalis, Pete Fountain, Joe Cocker, Pete Seeger, James Taylor, Bonnie Raitt, Tony Bennett, the Neville Bros., Bon Jovi, Dr. John and more will be playing at the fairground tents. Oh, and did we mention the food served at this party is not too bad either?

It is for this reason the ICOI is delighted to be holding its Spring Symposium, aptly titled, “Implants and All That Jazz” in New Orleans.

Plan to attend this symposium, from April 22-24, which is the ICOI’s annual implant prosthetic symposium and will feature several world-class restorative clinicians sharing the latest clinical techniques in the prosthetic discipline.

A significant portion of the program will be devoted to implant placement as well. A partial list of speakers includes Drs. David Guichet, Scott Ganz, Myron Nevins, Steve Wallace, Michael Pikos, Jaime Lozada, Joseph Kan, Ed Mills, Jack Krauser, Hom-Lay Wang, Larry Grill and Craig Misch.

Pre-symposium workshops conducted by sponsors include BioHorizons, Imtec, Nobel Biocare, Nubone, Piezosurgery and SommoMed.

The ICOI offers a scientific program schedule for your days. The nights, at Jazz Fest, you may remember for a lifetime.

This meeting will feature simultaneous translation into Spanish. Do not delay in registering and in making hotel reservations.

Visit the Web site at www.icoi.org for full details.
Astra Tech, a leading provider of comprehensive solutions for dental implant therapy, launched its OsseoSpeed™ TX implant line to the U.S. market at this year’s AO Annual Meeting.

The OsseoSpeed TX implant comes as the next step in the continuous evolution of the Astra Tech Implant System™ with its modified tapered apex design, first introduced with the launch of its narrow two-piece implant, OsseoSpeed TX 3.0 S in June 2008.

This new design modification allows for easier implant installation in all indications, especially in soft bone where under-preparation is often desired.

Ensuring optimal long-term esthetic results, all key features of the Astra Tech BioManagement Complex™, including OsseoSpeed fluoride-modified surface, Micro-Thread™ at the implant neck, a Conical Seal Design™ and the Connective Contour™, are maintained.

“We are extremely pleased with the overwhelming, positive response to this new design modification, received during the AO Annual Meeting,” said Scott Root, president and CEO, Astra Tech North America. “We are confident that this new modification will help to further simplify the implant treatment procedure for all our customers while still delivering the optimal results they’ve come to expect.”

About Astra Tech Implant System
The Astra Tech Implant System™ allows for full flexibility to meet the needs of every clinical situation whether one- or two-stage surgery, immediate placement or immediate load protocols, and in all bone qualities.

In more than 40 published articles, it is well-documented that when using the Astra Tech Implant System, the mean marginal bone level reduction is only 0.3 millimeters during the first year of loading and maintained thereafter.

These results are at least four times better when compared to the current standard norm of 1.5 mm marginal bone loss after five years.*

To learn more about OsseoSpeed-TX or other Astra Tech products and services, call (800) 551-3481 or visit www.astratechdental.com.

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