Implant Tribune

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Better horizontal ridge expansion

Using advanced minimal-invasive instruments and techniques allows for concomitant implant placement and regenerative procedures

By Liviu Steier & Gabriela Steier, U.K.

This 54-year old patient regularly attends our practice and takes part in our quarterly preventative program. His anamnesis contains no special entries. Figure 1 shows that the patient has lost tooth 12 as a result of a previously unsuccessful root canal treatment, followed by an unsuccessful apicotomy.

The prosthetic work has been in-situ for a long time and was performed alio loco. Secondary decay at the crown margins of tooth 11 created the need of prosthetic retreatment.

The different treatment options were explained in great detail to the patient, one of which was fixed restoration using implants. The patient decided on implantation in position 12, and was told that as a consequence of local infection, apicotomy and long-term tooth loss, the alveolar ridge has collapsed and guided bone regeneration would be needed to restore the optimum anatomical condition.

The existing porcelain fused to metal bridge (abutment teeth = 13 and 11, pontic = 12) was removed, decay eliminated and new adhesive core build-ups performed. Buccal infiltration anesthesia was given

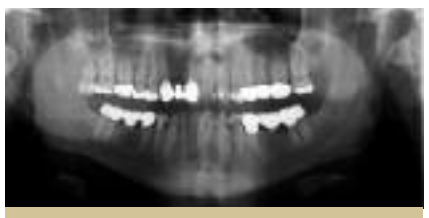

Fig. 1: Digital PAN before treatment.

Fig. 2:The initial bridge in place.

and the patient was offered a new metalic, composite, veneered bridge.

A full gingival flap was raised, allowing the extensions of the bone resorption to be identified. It was obvious that implant placement without bone augmentation could not be performed. The two treat-

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San Diego welcomes a 'New Wave' with AO

The Academy of Osseointegration Annual Meeting took place at the San Diego Convention Center from Feb. 26–28.

Group's annual meeting features innovations in implant therapy

By Robin Goodman, Group Editor

San Diego, California's second largest city, welcomed attendees to the Academy of Osseointegration's 24th Annual Meeting with its gentle Mediterranean climate and beckoned them outside during the breaks between lectures.

However, the exhibit hall proved to be quite a draw as well. After the boxed lunches distributed in the exhibit hall were consumed, the proximity of more than 120 booths made it difficult to exit before stopping to get up close and personal with the items on display.

Thursday, Feb 26, the first day of the meeting, was filled with well-attended corporate forums from some of the biggest names in the business — BioHorizons, BIOMET 3i, Nobel Biocare, OsteoHealth, Piezosurgery, Straumann, Sybron Implant Solution and Zimmer Dental.

During the opening symposium, which featured music by a live three-piece jazz band while attendees took their seats, AO President Steven G. Lewis, DMD, started off a full afternoon of lively lectures that lasted until 5:15 p.m.

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Composite shows significantly higher new bone regeneration

The key to success for dental implants lies in the volume and quality of the bone in the recipient. Because a scarce amount of bone is often a problem, guided bone regeneration is a well-established solution.

A study in the current issue of the Journal of Oral Implantology demonstrates complete bone regeneration of critical-size bone defects using a composite alloplastic graft of beta-tricalcium phosphate (ß-TCP) in a calcium sulfate (CS) matrix without a membrane barrier.

Tricalcium phosphate (TCP), which is considered bioactive and biocompatible, is an alloplastic ceramic material that shows promise as a bone graft substitute. TCP cements have a slower resorption rate than bone, however, and are rather dense.

By adding a faster resorbing material, pores may be created, ensuring new bone tissue growing into the defect. CS is a material that can fill that need.

When CS is mixed with other bone graft materials, the osteogenesis is accelerated, the study finds. Calcification is increased and the needed quantity of new bone is achieved in a shorter period of time.

In the study, two types of bone substitute were tested: Fortoss Resorb®, a porous ß-TCP synthetic graft, and Fortross Vital®, a synthetic composite biomaterial based on a porous ß-TCP in a matrix of CS.

Artificial defects were created on each iliac crest in four dogs. The experimental defects were treated in three groups: ß-TCP alone (Fortoss Resorb), ß-TCP in a CS matrix (Fortross Vital), and ungrafted to heal spontaneously.

After these defects were left to heal for four months, a significant difference was shown between the two ß-TCP groups. The study concludes that the "ß-TCP/CS combination demonstrated complete regeneration up to the cortex in all 10-mm specimens tested, while ß-TCP alone did not succeed in regenerating these large-diameter defects."

The full text of the article, "Bone Regeneration Using Beta-Tricalcium Phosphate in a Calcium Sulfate Matrix," is available at *www.allenpress.com*.

About Journal of Oral Implantology

The Journal of Oral Implantology distinguishes itself as the first and oldest journal in the world devoted exclusively to implant dentistry. The official publication of the American Academy of Implant Dentistry and of the American Academy of Implant Prosthodontics, the journal is dedicated to providing valuable information to general dentists, oral surgeons, prosthodontists, periodontists, scientists, clinicians, laboratory owners and technicians, manufacturers, and educators. Topics include implant basics, prosthetics, pharmaceuticals, the latest research in implantology, implant surgery, and advanced implant procedures. To learn more about the society, visit *www.aaid-joi.org*.

(Source: Journal of Oral Implantology)

Nobel Biocare unveils results from largest U.S. consumer dental survey

Survey reveals almost 50 percent have missing teeth and few understand the health consequences

Nobel Biocare announced the results of the largest known consumer survey in dentistry at the 24th Annual Meeting of the Academy of Osseointegration in late February. The survey, which evaluated the responses of nearly 55,000 consumers, provides new insight into the prevalence of missing teeth in America and the general lack of understanding about the health consequences of missing teeth.

The survey revealed the emphasis consumers place on their smile when considering their overall appearance. The survey found that smile and appearance of teeth scored the highest (first and second, respectively) in terms of importance to personal appearance — exceeding hair, clothes, eyes, facial features and physique. In fact, nearly 90 percent of respondents ranked their smile as the most important attribute and almost 87 percent ranked the appearance of teeth as the second most important feature.

"As dentists, we are very aware of the underlying health issues that can be associated with missing teeth. In this survey, we wanted to better understand how missing teeth affected patients on an emotional level and determine their awareness of the associated consequences," said Dr. Neil Park, vice president of professional relations, Nobel Biocare. "The results from this survey have provided us with a deeper understanding of the importance of a smile to people, and underscore the need for better consumer education highlighting the consequences of tooth loss and the available treatment options that can increase satisfaction."

The survey revealed that nearly 50 percent of adults are missing at least one tooth. While most adults were aware of the visible consequences of missing teeth, including difficulty chewing food and impact to the appearance of a smile, there was limited awareness of the more serious health consequences, which can include bone loss that may lead to changes in the shape of the face and repositioning of existing teeth.

While there was a very strong correlation between prevalence of missing teeth among lower income households and among those with less educational achievement, the presence of missing teeth was still shown to have a remarkably high prevalence even among adult Americans with higher incomes.

For more information visit *www.usdentalsurvey.com*.

(Source: Nobel Biocare)

IT Corrections

Implant Tribune strives to maintain the utmost accuracy in its news and clinical reports. If you find a factual error or content that requires clarification, please report the details to Managing Editor Sierra Rendon at s.rendon@dtamerica.com.

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Publisher
Torsten Oemus
t.oemus@dtamerica.com

President
Peter Witteczek
p.witteczek@dtamerica.com

Chief Operating Officer
Eric Seid
e.seid@dtamerica.com

Group Editor
Robin Goodman
r.goodman@dtamerica.com

Editor in Chief
Sascha A. Jovanovic, DDS, MS
sahara@jovanoviconline.com

Managing Editor/Designer
Sierra J. Rendon
s.rendon@dtamerica.com

Managing Editor Endo Tribune
Fred Michmershuizen
f.michmershuizen@dtamerica.com

Managing Editor Ortho Tribune
Kristine Colker
k.colker@dtamerica.com

Account Manager
Humberto Estrada
h.estrada@dtamerica.com

Marketing Manager
Anna Wlodarczyk
a.wlodarczyk@dtamerica..com

Marketing & Sales Assistant
Lorrie Young
l.young@dtamerica.com

C.E. Manager
Julia Wehkamp
j.wehkamp@dtamerica.com

Design Support
Yodit Tesfaye
y.tesfaye@dtamerica.com

Dental Tribune America, LLC
213 West 35th Street, Suite 801
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Go green for healthy teeth, gums

New study suggests antioxidants in green tea may help reduce periodontal disease

With origins dating back more than 4,000 years ago, green tea has long been a popular beverage in Asian culture, and is increasingly gaining popularity in the United States. And while ancient Chinese and Japanese medicine believed green tea consumption could cure disease and heal wounds, recent scientific studies are beginning to establish the potential health benefits of drinking green tea, especially in weight loss, heart health and cancer prevention.

A study recently published in the Journal of Periodontology, the official publication of the American Academy of Periodontology (AAP), uncovered yet another benefit of green tea consumption.

Researchers found that routine intake of green tea may also help promote healthy teeth and gums. The study analyzed the periodontal health of 940 men, and found that those who regularly drank green tea had superior periodontal health than subjects who consumed less green tea.

"It has been long speculated that green tea possesses a host of health benefits," said study author Dr. Yoshihiro Shimazaki of Kyushu University in Fukuoka, Japan. "And since many of us enjoy green tea on a regular basis, my colleagues and I were eager to investigate the impact of green tea consumption on periodontal health, especially considering the escalating emphasis on the connection between periodontal health and overall health."

Male participants aged 49 through 59 were examined on three indicators of periodontal disease: periodontal pocket depth (PD), clinical attachment loss (CAL) of gum tissue, and bleeding on probing (BOP) of the gum tissue.

Researchers observed that for every one cup of green tea consumed per day, there was a decrease in all three indicators, therefore signifying a lower instance of periodontal disease in those subjects who regularly drank green tea.

Green tea's ability to help reduce symptoms of periodontal disease may be due to the presence of the antioxidant catechin.

Previous research has demonstrated antioxidants' ability to reduce inflammation in the body, and the indicators of periodontal disease measured in this study, PD, CAL and BOP, suggest the existence of an inflammatory response to periodontal bacteria in the mouth.

By interfering with the body's inflammatory response to periodontal bacteria, green tea may actually help promote periodontal health, and ward off further disease. Periodontal disease is a chronic inflammatory disease that affects the gums and bone supporting the teeth, and has been associated with the progression of other diseases such as cardiovascular disease and diabetes.

"Periodontists believe that maintaining healthy gums is absolutely critical to maintaining a healthy body," said Dr. David Cochran, DDS, PhD, president of the AAP and chairman of the Department of Periodontics at the University of Texas Health Science Center at San Antonio. "That is why it is so important to find simple ways to boost periodontal health, such as regularly drinking green tea — something already known to possess certain health-related benefits."

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(Source: Journal of Oral Implantology)

First interventional CT scanner for dental implants in the U.S.

While 3-D CT scanners are starting to be used for dental implant planning, they are usually only available before the procedure. An innovative surgeon, Dr. Michel Matouk has devised a new protocol to improve precision by obtaining CT scans during surgical procedures, when they are most needed. This allows improved computer-planned and computer-guided implant surgery, therefore providing less invasive and more accurate placement of cosmetic dental implants.

When Peter S. was told his front tooth needed extraction, he hoped he could find a way to get immediate implant replacement under general anesthesia. "When Dr. Matouk discussed the possibility of CT scanning during the procedure to improve precision, I knew this would give the best result," he said. The scan revealed an adequate bony volume for implant placement at the exact site needed after the extraction, while he was still sedated. The implant was then placed uneventfully.

Matouk, a dental implant and maxillofacial surgeon, has been working on precision surgical navigation for years. His efforts just culminated in the development of computer-aided implantation using intra-operative CT scans. This new technology is currently limited to a few major neurosurgical academic centers and has not been applied to any dental surgery offices in the United States. It provides real-time tracking of surgical results. The technology uses a cone beam CT (CBCT), an alternative to conventional CT, which provides three-dimensional radiographic imaging, on-site, while reducing radiation 90 percent compared to hospital-based computer-assisted tomography (CT). High-end dental implant centers are starting to offer CBCT to improve planning before the placing of dental implants. However, surgery is a fluid process and sometimes plans have to be modified; at that point, the surgeon is working "blindly." The final result can then only be evaluated after the case is finished.

One to two millimeters, however, can mean the difference between success and failure in cosmetic dental implant surgery. It is for these complex situations that Matouk, a dually licensed physician and dentist, saw the need for interventional CBCT. He researched the different CBCT systems available and chose the one with the most field of vision and least radiation, and then proceeded to modify it to allow for intra-operative interventional use. As soon as he used it, he realized the new doors that this technology opens. And while surgical procedures have not changed, now the accuracy of the final result can be confirmed prior to the end of the case.

(Source: South Florida Dental Implant & Facial Surgery Center)

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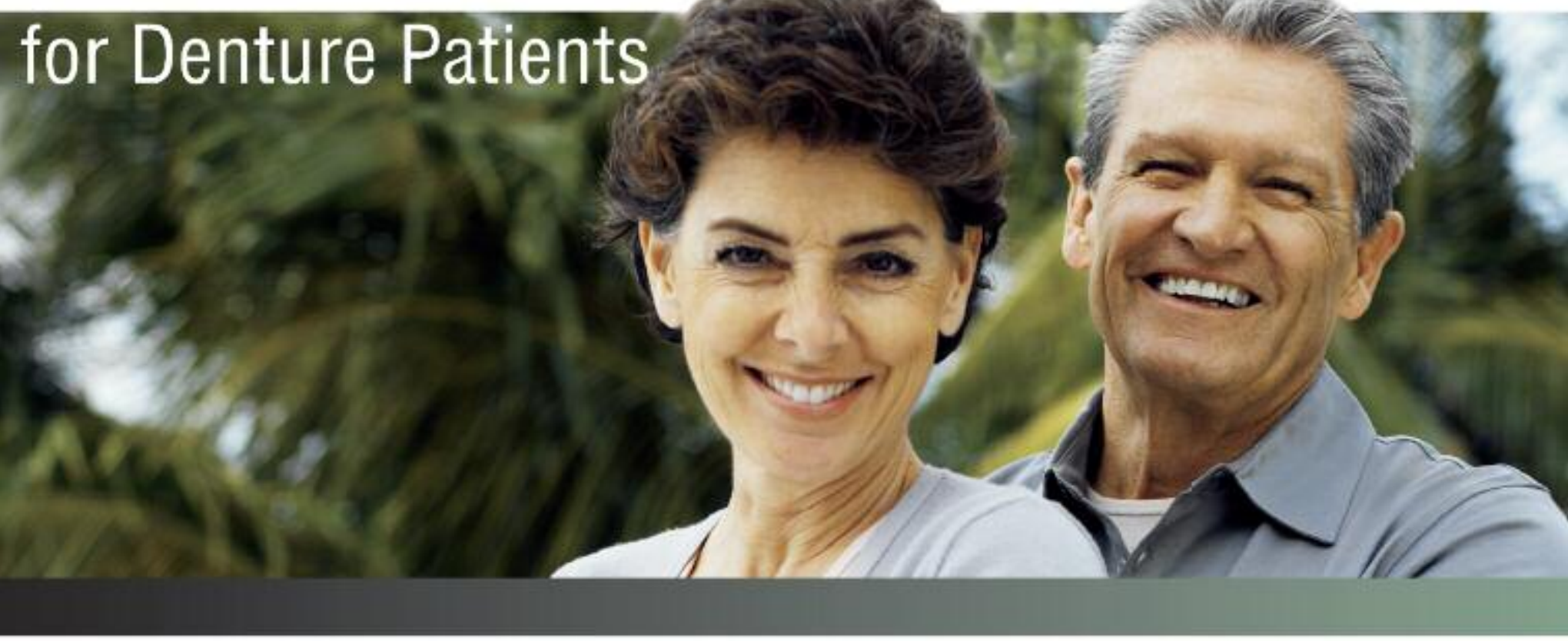

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ment options available were:

1) Vertical and horizontal bone augmentation with a healing time of at least five months and an implant placement with an additional surgery.

2) Horizontal ridge widening with immediate implant placement and bone grafting. Of course, there were advantages and disadvantages of each treatment option.

Advantages of bone augmentation and implant placement in two stages:

- Direct full control of bone augmentation procedure.
- Predicatable bony support at implant placement time.
- Risk-free implant placement.

Disadvantages of bone augmentation and implant placement in two stages:

- Treatment delay by healing time of at least five months.
- Two surgical procedures needed.

Advantages of bone augmentation and implant placement at the same time:

- Single surgical procedure.
- Reduced healing time.

Disadvantages of bone augmentation and implant placement at the same time:

- Bone management knowledge skills for the surgeon requested.
- Additional technical equipment required.

Meisinger offers a so-called Split Control instrument kit it described as a "[...] minimally invasive alternative to osteotomes. Bone spreading and bone condensing with special screw-like instruments (spreaders) achieve a controlled and standardized dilation of horizontally resorbed bone and a gentle densification of cancellous bone."

Fig. 3: Direct view of the horizontal bone resorption after removal of the temporary restoration.

Fig. 4: Primary incision line is placed in the sulcii of the adjacent teeth using a 15 C scalpel blade.

Fig. 5: Second incision: a crestal incison line lightly deviated toward the palatal compliments the sulcular incisons.

Fig. 6: Full gingival flap isolation.

Fig. 7: Split Control Kit by Meisinger.

Fig. 8: The spreaders are screwed into the bone with a hand ratchet.

Fig. 9: Implant guide in place (Innovative Implant Technology).

Fig. 10: Direct view of the implant alveola as performed by the manual spreaders.

Fig. 11: A D3 – 12 mm in length and 3.5 mm diameter Biohorizons implant (external hexlock) is manually fixated and then rotary screwed into a torque of 32 N/cm2.

The Split Control Kit by Meisinger (*www.bone-management.com*) contains different sized screws, built similarly to a Hed-

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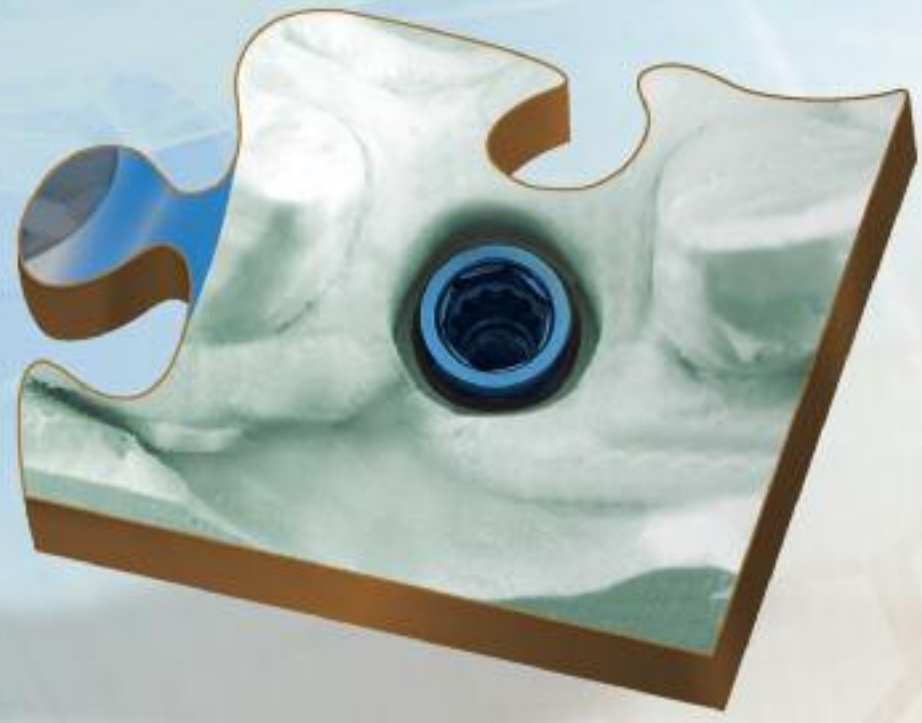

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Fig. 12: Direct view of the Biohorizons implant.The neck of the implant is seated exactly at the crest of the bone level.

Fig 13: To improve the local blood perfusion, small and superficial bony defects were added to the regeneration area.

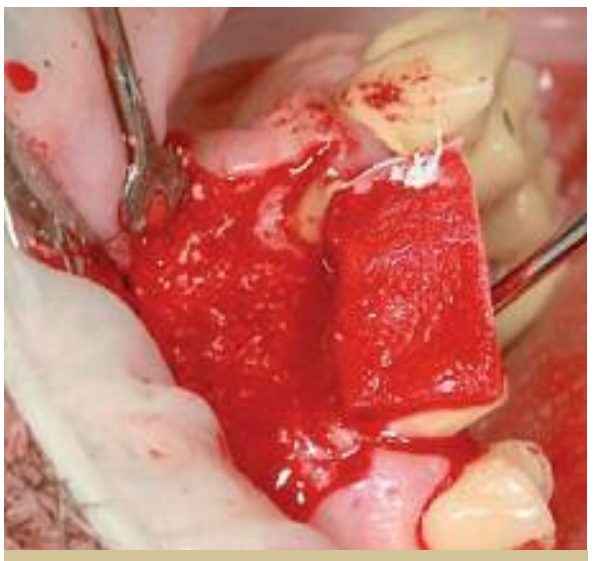

Fig. 14: Bio-Oss® Spongiosa small granules in place.

Fig. 15: Direct view of the augmented area and the BioGide membrane still reflected. The excellent blood perfusion from the bone is visible.

Fig. 16: Flap sutured in place.

Fig. 17: The pontic of the temporary restoration appeared overextended due to the three-dimensional augmentation. The needed reduction was marked.

Fig. 18: Temporary restoration after resizing.

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ström file, but reversed. Initial small-sized drills are offered within the kit intended for use as markers and access instruments, and to be followed by the spreaders in increasing dimensions.

The implant guiding system (by Innovative Implant Technology) was used to two-dimensionally position the primary marker drill. To begin with, an 010 followed by an 018 pilot drill was used, complimented by an expansion burr in the size of a 023 burr. The bony spreading was performed using the following spreaders: 027, 029, 031, 033.

As a next step, the guided bone regeneration was performed. To augment the buccal resorption, Bio-Oss Spongiosa small granules, 0.25 mm (Geistlich Biomaterials), were used and covered with Geistlich Bio-Gide resorbable bilayer membrane 25 x 25 mm both soaked in wound blood.

With the membrane covering the augmentation material, additional fixation of the membrane was avoided because of the available fixation and immobilization using the soft tissue.

The flap was sutured in place crestally using GoreTex suture because of its mechanical performance. The lateral-releasing incisions were closed using 6x0 Prolene suture material.

Fig. 19: The temporary was recemented in place avoiding pressure in the augmented area.

Fig. 20: The correct three-dimensional position of the BioHorizons implant was confirmed with an X-ray.

Conclusion

The buccal bone plate can resorb to a severe degree as a result of tooth loss. Conventional implantologic reconstructive therapy supposed until recently a two-stage approach: guided bone regeneration followed by a five-month healing time and a second surgery for fixture installment.

Using advanced minimal-invasive instruments for extremely thin-ridge expansion allows for concomitant implant placement and regenerative procedures.

IT About the author

Dr. Liviu Steier is a GDC-registered specialist in endodontics, professor at the University of Florence Dental School and professor of the Tufts School of Dental Medicine. He also maintains a private practice, MS Dentistry at 20 Wimpole St., London W1G 8GF, *www.msdentistry.co.uk*. Dr. Steier is also the current president of the British Academy of Oral Bone Grafting and offers bone management courses together with Dr. Siavash Mirfendereski, also of MS Dentistry. He can be contacted at lsteier@gmail.com.