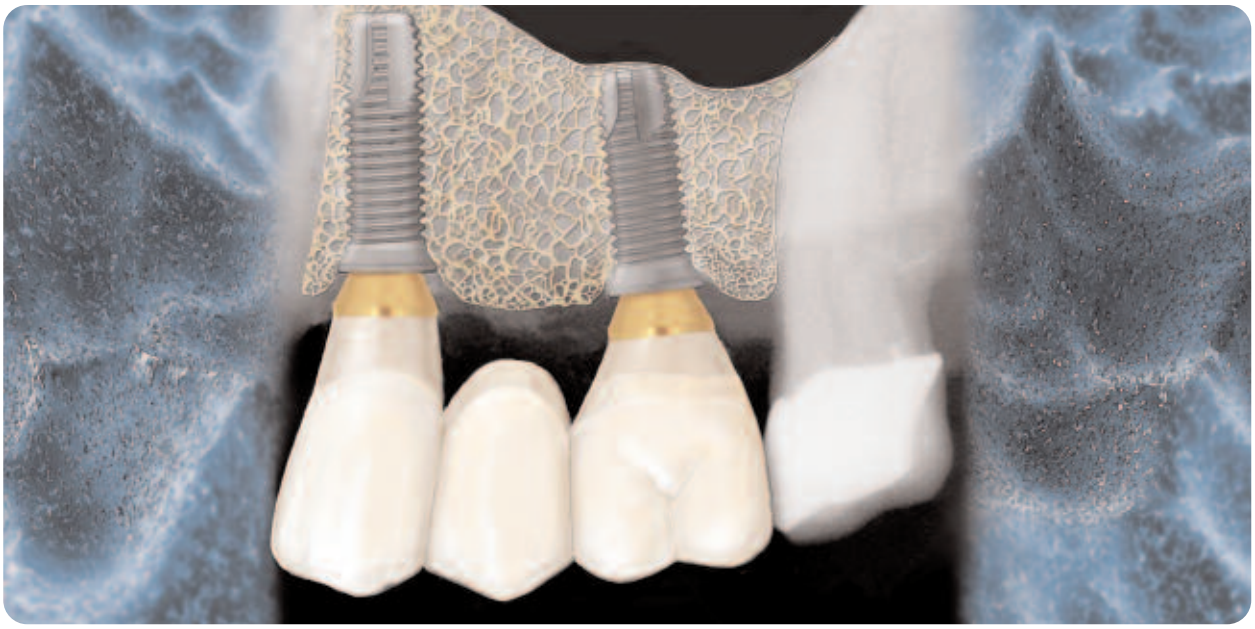

Clinical Perspectives

Volume 6, Issue 1

NanoTite™ Implants: The Next Generation Of Dental Implants

By Richard J. Lazzara, DMD, MScD

Implant dentistry continues to evolve and biomedical scientists and engineers are exploring new concepts with advanced technologies. We have evolved from the days of high speed intraoral preparation with a conventional dental handpiece (blade implants), to the first days of the two-stage implant protocol, using machined surfaced implants (unloaded healing) with two surgeries in edentulous patients. Today, our patients missing one or more teeth have come to expect excellent, natural aesthetics along with return to normal function in an accelerated timeline. The development of the OSSEOTITE® Dual-Acid-Etched Implant Surface improved on the results seen with machined implants. With OSSEOTITE Implants, long term Cumulative Survival Rates (CSRs) improved from the 85%–95%[1,2] seen with machined implants to the 95%–98%[3,4] range reported by numerous researchers around the world.

So why do researchers and industry continue to research and develop new advances in implant surface technology? With the proven OSSEOTITE Implant, high survival rates are achieved on a predictable basis, even in compromised clinical situations, ie, early loading, smokers.*

Implants typically demonstrate good primary stability at the time of placement—in principle, a mechanical phenomenon. However, when bone remodels in the weeks following implant placement, primary implant stability can degrade which in turn might impact the ability to perform early or immediate loading protocols. This may lead to an increased potential for implant failure.

To meet the needs of clinicians in treating these more challenging cases, BIOMET ***3i*** applied nano-scale crystals of calcium phosphate onto the OSSEOTITE Surface by using a Discrete Crystalline Deposition™ (DCD™) Process. This application of nanotechnology resulted in a new surface which leverages the clinically proven OSSEOTITE Surface as the substrate while maximizing the known biologic benefits of calcium phosphate in bone formation and healing. The result: the NanoTite Implant, an implant with a more complex topography that may have the potential to accelerate healing.* The goal of this new implant surface is to enhance osseointegration at early time points.

The calcium phosphate (CaP) on the NanoTite Implant is **not** a coating. Instead the NanoTite Implant consists of actual deposits of discrete crystals that occupy approximately 50% of the OSSEOTITE Surface **within** its peaks and valleys. Further, the total amount of CaP material on a NanoTite Implant is so small that it measures less than 20 micrograms—this is in contrast to as many as 20,000 micrograms with plasma-sprayed implants. In addition, the DCD Process increases the micro surface area by 200% providing greater micro complexity, which ultimately may play a role in early bone formation.

As clinicians, this means that the NanoTite Implant may be suitable for cases such as:

- Immediate and accelerated loading protocols*
- Immediate implant placement in extraction sockets
- Simultaneous grafting and implant placement
- Aesthetic areas where bone preservation is critical to the overall success of the treatment
- Implant placement into poor quality bone
- Anatomic sites that require short or wide diameter implants instead of more invasive surgical procedures prior to implant placement

The clinical case presentations to follow from colleagues around the world, demonstrate the use of NanoTite Implants in various clinical situations. Each of these case presentations are representations of the individual clinician's experience in clinical practice and may not be indicative of other cases due to varying patient and clinician scenarios. The preclinical data supporting accelerated healing with the NanoTite Implant are promising.** As long term prospective clinical trials progress, additional CSR results will be published. In the end, we aim to provide implant therapy to more patients with higher survival rates and shorter treatment times.

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*See back cover

**Data on file

*Immediate Loading Of Two NanoTite™ PREVAIL® Implants With PreFormance® Provisional Components**

Clinical Treatment By Roberto Cocchetto, DMD (Italy)

INITIAL PATIENT PRESENTATION

A 59-year-old male patient presented to the dental clinic missing the mandibular left first molar and second premolar tooth #'s 19 and 20. The hopeless teeth (Figure 1) had been extracted eight months prior and the site grafted with a bovine graft material. There was adequate bone volume and restorative volume for implant placement (Figure 2), as well as an abundant amount of keratinized attached gingiva.

DIAGNOSIS

- Partially edentulous mandible (missing mandibular left first molar and second premolar tooth #'s 19–20)
- Adequate bone quality and quantity for implant placement
- Adequate soft tissue dimension
- Adequate interocclusal clearance with the opposing natural dentition

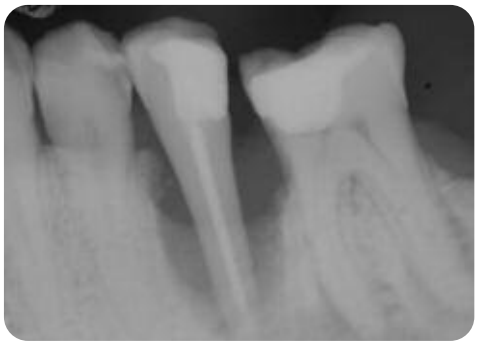
TREATMENT PLAN

- Fabrication of a diagnostic cast, wax patterns and surgical guide
- Placement of two NanoTite PREVAIL Implants (4/5/4mm diameter x 10 and 11.5mm length)
- Placement of PreFormance Posts for use as interim abutments
- Immediate loading with a chairside screw-retained provisional restoration
- Osseointegration/soft tissue maturation
- Implant level impression two months post implant placement
- Placement of the definitive prosthesis four months post implant placement

SURGICAL TREATMENT

A full thickness mucoperiosteal flap was reflected in the left mandibular posterior quadrant. Osteotomies were prepared for two NanoTite PREVAIL Implants (4/5/4mm diameter x 10 and 11.5mm length) (Figure 3). The implant restorative platforms were placed at the level of the osseous crest (Figure 4). Both implants had insertion torque values of at least 35Ncm. These were considered to have adequate primary stability and were candidates for immediate loading.

*See back cover



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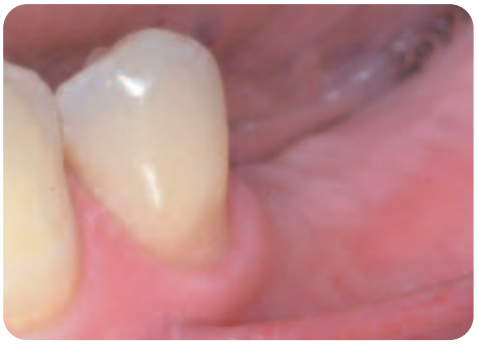

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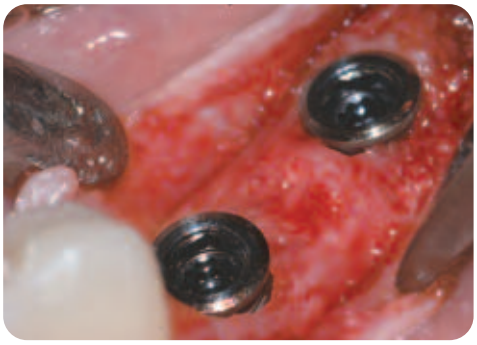

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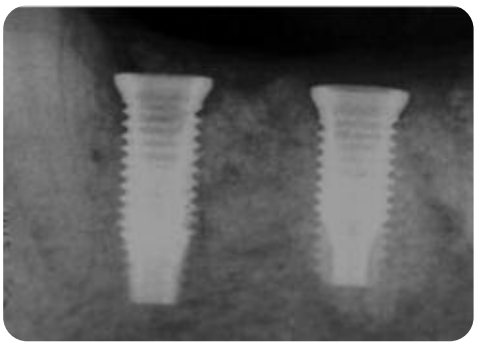

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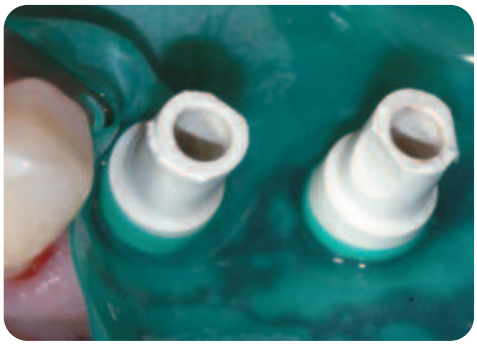

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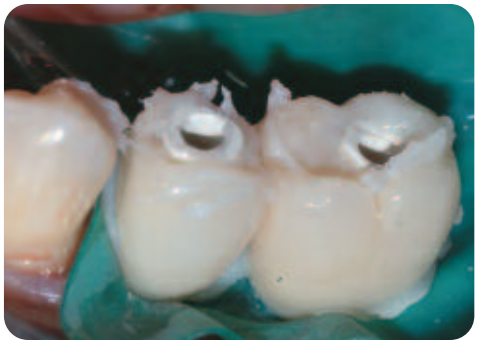

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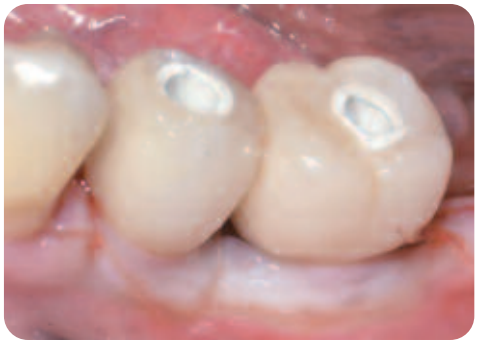

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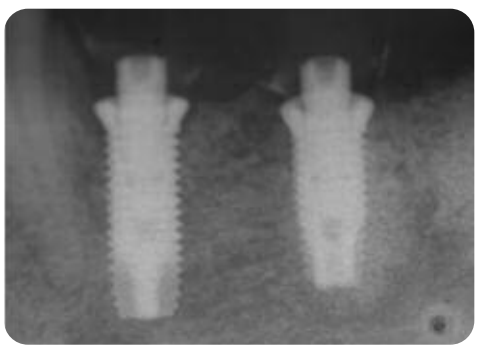


Figure 8

PROVISIONALIZATION

PreFormance® Posts were chosen consistent with the size of the teeth that were to be replaced. The interim abutments were inserted into the implants and retained with abutment screws. A rubber dam was used to isolate the surgical site from the autopolymerizing acrylic resin used to make the screw-retained provisional restoration. These were then prepared intraorally for adequate interocclusal clearance and parallelism (Figure 5).

Autopolymerizing acrylic resin was placed into a template developed from the diagnostic wax patterns and inserted onto the interim abutments (Figure 6). The initial set occurred intraorally and final polymerization occurred extraorally. Optimal emergence profiles were developed within the provisional restoration.

The provisional restoration was contoured, polished and inserted into the internal interface of the implants. Abutment screws were placed and tightened to 20Ncm of torque. The screw access openings were blocked out with cotton and restored with zinc oxide and eugenol temporary cement. The provisional restoration had occlusal contacts in centric occlusion. There were no contacts in lateral working and balancing movements. The patient was given oral hygiene instructions and was discharged with the fixed provisional restoration in place (Figure 7).

A post insertion radiograph was taken. Since the PreFormance Posts are radiolucent, the implant/abutment interface cannot be visualized (Figure 8). The radiograph is important to identify the baseline bone levels immediately post implant placement.

NOTE: With cement-retained provisional restorations, the post insertion radiograph can be used to ascertain that all cement has been removed from the surgical site(s).

RESTORATIVE TREATMENT

Approximately four months post implant placement, the patient returned for evaluation of osseointegration and soft-tissue contours and the definitive impression of the implant restorative platforms (Figure 9). Excellent soft-tissue healing around the PreFormance Posts (PEEK-polyetheretherketone) was noted. The definitive polyvinylsiloxane impression was made with implant impression copings in place.

A master cast was developed according to conventional prosthodontic protocols. Pre-machined titanium alloy abutments, GingiHue® Posts, were chosen consistent with the size of the missing teeth and the emergence profiles established by the provisional restoration. The GingiHue

Posts were prepared consistent with retention and resistance form for a splinted cement-retained implant restoration. The patient returned approximately one month after the definitive impression for insertion of the definitive abutments and splinted restoration.

NOTE: It is not mandatory to splint implant-supported crowns in the posterior mandible. In this case, the restorations were splinted due to patient preference.

The provisional restoration was removed. The implants were stable and considered to be osseointegrated. The GingiHue® Posts were inserted and a verification radiograph was taken that confirmed the abutments were seated. The abutment screws were torqued to 20Ncm with a torque driver (Figure 10). The splinted restoration was tried in, adjusted interproximally and contoured for optimal occlusal contacts in centric and eccentric positions (Figure 11).

A post insertion radiograph was taken that demonstrated both implant restorative platforms were consistent with the levels of the osseous crest in both implant sites (Figure 12). Another radiograph will be taken 12 months post implant placement and evaluated relative to bone levels and adaptation of the bone to both implants.

CLINICAL OVERVIEW

This clinical case demonstrates the use of two NanoTite™ PREVAIL® Implants in the posterior mandible that were immediately loaded with interim abutments (PreFormance® Posts) and a provisional FPD. Both implants achieved high insertion torque values at implant placement and were splinted with a screw-retained provisional restoration. Healing occurred uneventfully. The definitive abutments and splinted restoration were inserted approximately four months post implant placement.

Dr. Cocchetto graduated in Medicine and Surgery at the University of Padova and then in Dentistry at the University of Verona. He has attended Continuing Education programs at the University of Southern California Los Angeles in Prosthodontics. He is Professor at the Course on Advanced Implantology at the University "G. D'Annunzio" in Chieti. Dr. Cocchetto is a clinical researcher for BIOMET ***3i*** on implant prosthodontics and implant surgery, for which he lectures extensively in Italy and abroad. He is in private practice in Verona limited to implantology and prosthodontics.

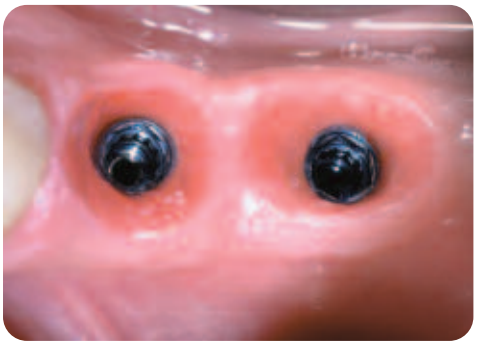
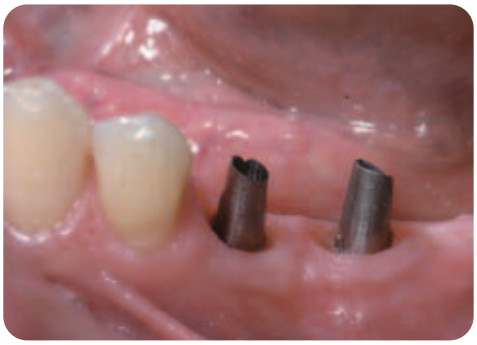


Figure 9



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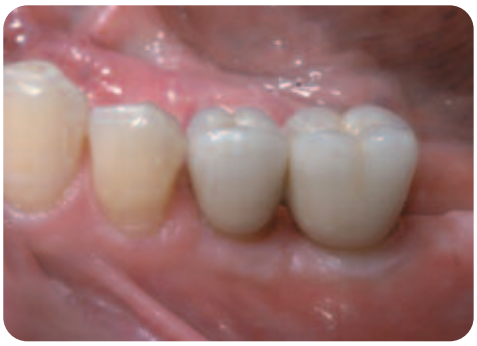

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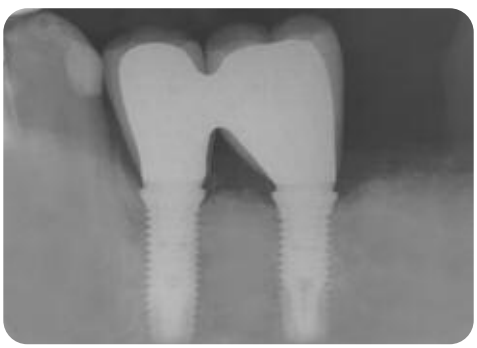


Figure 12

Immediate Placement Of A NanoTite™ PREVAIL® Implant With Simultaneous Grafting

Clinical Treatment By Harold S. Baumgarten, DMD (USA)

INITIAL PATIENT PRESENTATION

A 61-year- old male patient presented with a vertically fractured mandibular right first molar tooth #30. The patient's chief complaint was that he had "pain on chewing." Clinical examination revealed tenderness upon buccal palpation. He also presented with a periodontal pocket which measured 11mm on the buccal aspect of the distal root (Figure 1). A periapical radiograph revealed that the tooth had been endodontically treated and was restored with a PFM crown (Figure 2).

DIAGNOSIS

- Vertical, non-restorable root fracture of the mandibular right first molar #30
- Adequate bone volume for implant placement
- Adequate restorative volume for implant restoration

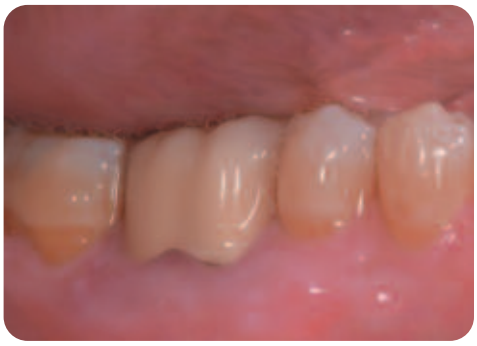
TREATMENT PLAN

- Atraumatic hemisection and extraction of the tooth roots #30 and socket debridement
- Immediate placement of an internally interfaced 5/6/5mm diameter x 13mm length NanoTite PREVAIL Implant
- Placement of graft material, membrane and EP® Healing Abutment
- Osseointegration and soft tissue maturation
- Implant level impression at 14 weeks post implant placement
- Fabrication of definitive abutment and implant/crown restoration

SURGICAL TREATMENT

A full thickness mucoperisoteal flap was elevated around the mandibular right first molar. The vertical distal root fracture and resultant infrabony defect were easily visualized (Figure 3). To minimize the amount of surgical trauma to the alveolus, the tooth was hemisected and each root was extracted individually. The sockets were carefully debrided with hand and rotary instruments (Figure 4).

An osteotomy was prepared for placement of a 5/6/5mm x 13mm length NanoTite PREVAIL Implant. The osteotomy was accomplished in the interseptal bone of the extraction site. This maximized stability of the implant in the remaining alveolar bone, while optimally positioning the implant in the site. The



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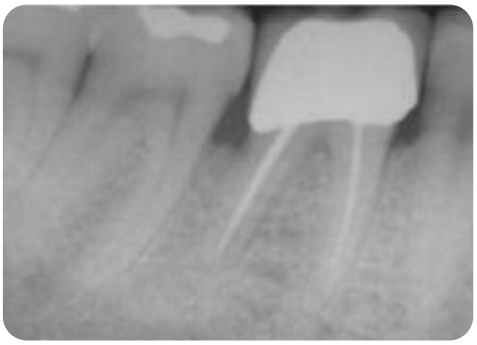

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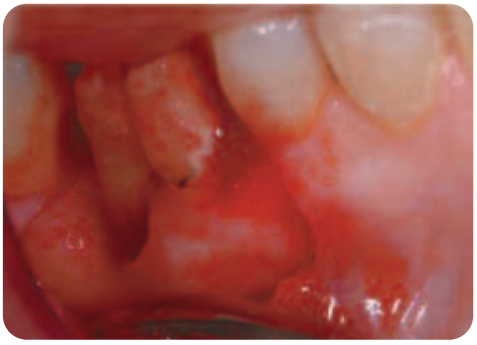


Figure 3

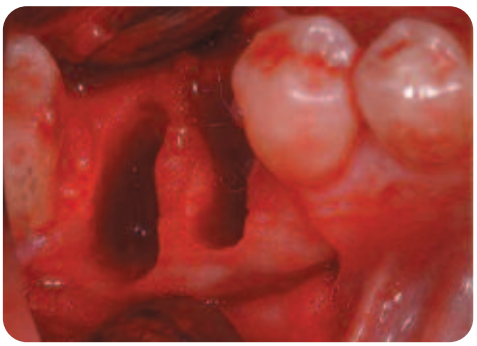


Figure 4

buccal and lingual aspects of the implant were in direct contact with the bone. However, the mesial and distal aspects of the implant were in direct contact with the alveolar bone only at the apical one-third of the implant. The insertion torque was set to 50Ncm on the drilling unit. The implant was hand ratcheted to final seating (Figure 5).

Clinical Tip: The insertion torque limit value at implant placement is an excellent measure of primary stability.

An implant cover screw was placed temporarily to prevent bone graft material from entering the internal threads of the implant. The mesial and distal bony defects around the implant were grafted with decalcified bone matrix in a lecithin putty (Allogenix™) (Figure 6).

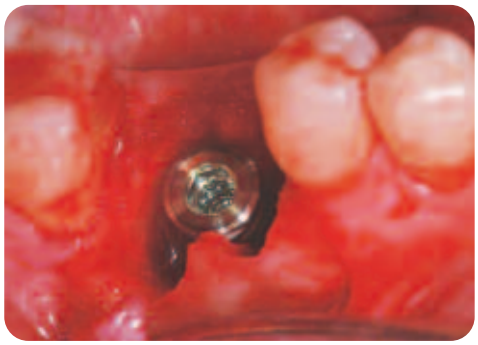
The cover screw was removed and a bone profiler was used to prepare the coronal aspect of the osteotomy to accept a 7.5mm EP® (Emergence Profile) Healing Abutment. A resorbable collagen membrane was trimmed to cover the graft material and surgical site. A 5mm diameter hole was punched in the center of the membrane using a disposable dermal biopsy punch. The membrane was placed and the healing abutment was placed through the hole in the membrane and into the implant body. Care was taken to ensure that the membrane was not caught between the healing abutment and the implant seating surface (Figure 7).

NOTE: The advantage of doing a graft as a single-stage procedure is to avoid extensive flap reflection for adequate flap mobility and primary closure around the healing abutment. This generally results in less swelling, less hematoma formation and less post-operative discomfort for patients.

The site was sutured with 4.0 GoreTex® Sutures (Figure 8). The patient was dismissed with instructions to avoid masticating on the treated side and to avoid foods that contain seeds or make crumbs such as crackers and crusty bread. A radiograph was taken immediately post implant placement (Figure 9). The decalcified bone matrix was radiolucent and therefore was not visible on the radiograph. The sutures were removed two weeks post operatively.

RESTORATIVE TREATMENT

The patient requested that treatment be expedited due to his inability to chew. Therefore, at 14 weeks, the healing abutment was removed and an Osstell™ Smartpeg was placed. An ISQ (Implant Stability Quotient) Reading of 73 was obtained. This reading indicated a high level of implant stability. It was decided to move forward with an implant level impression and fabrication of the definitive abutment and crown restoration.



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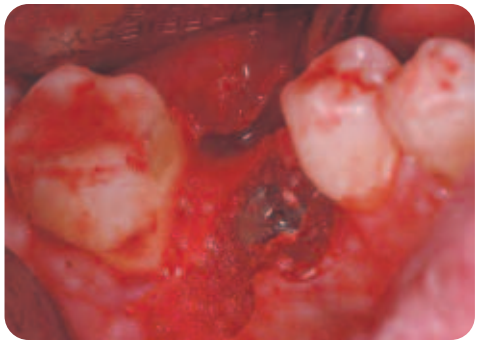

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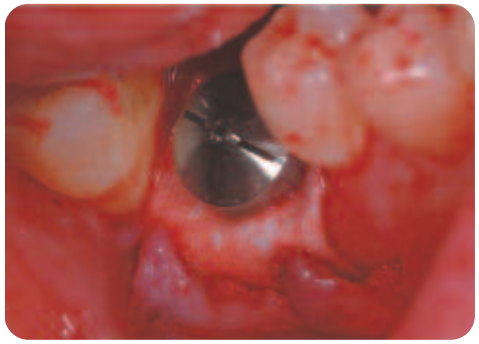

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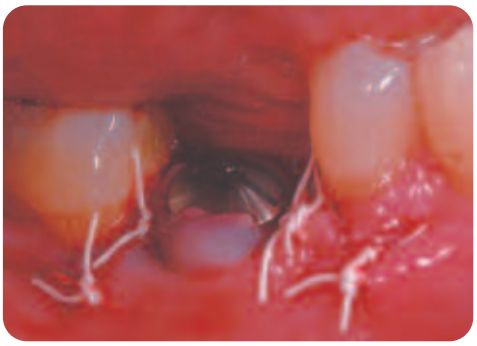

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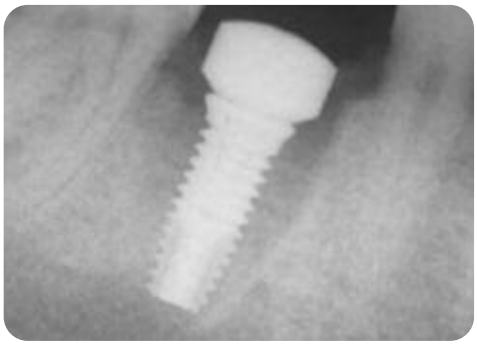

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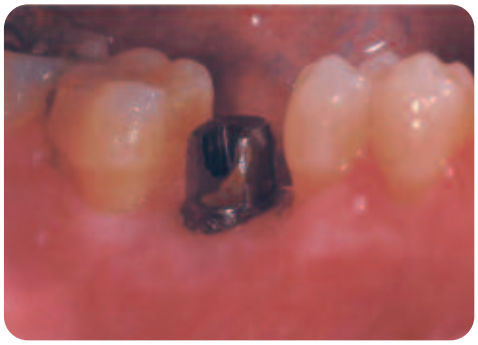

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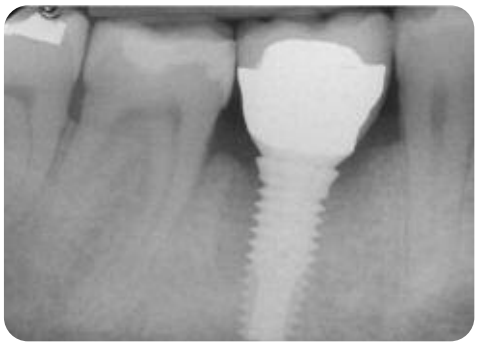

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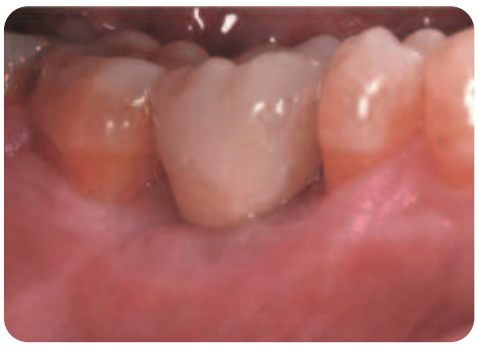


Figure 12

A Certain® Implant Transfer Impression Coping was placed into the internal interface of the implant. An audible and tactile click indicated that the impression coping was completely seated into the implant. A verification radiograph was taken to visually confirm that the impression coping was accurately seated.

The impression was made of the implant, as well as an alginate impression of the maxillary dentition. The impressions were sent to a commercial dental laboratory (Alfred Nelson, CDT, Amsterdam Dental Laboratory, Philadelphia, PA) along with an interocclusal registration and shade selection. The master cast was made per conventional prosthodontic protocol. A pre-machined titanium alloy abutment, GingiHue® Post, was selected, placed into the master cast and prepared for use as an abutment and the cement-retained definitive crown was fabricated.

At the insertion appointment, the healing abutment was removed and the prepared GingiHue Post was seated into the internal interface of the implant. An audible and tactile click ensured complete seating of the abutment into the implant (Figure 10). The crown was tried-in and the interproximal and occlusal contacts were adjusted. A verification radiograph was taken to verify that the crown was seated onto the abutment and the abutment was completely seated into the implant (Figure 11). The crown was removed, and the abutment screw was torqued to 20Ncm with a torque driver. The abutment screw torque was accomplished without incident. No tenderness or macroscopic movement was noted. The crown was cemented with zinc oxide/eugenol cement (Temrex™) (Figure 12). The patient was dismissed with appropriate instructions for oral hygiene.

CLINICAL OVERVIEW

This clinical case illustrates an implant protocol that involves placement of a wide diameter NanoTite™ PREVAIL® Implant directly into interseptal bone of a molar extraction site, immediately post extraction of the tooth. The implant was placed with a high insertion torque value (>50Ncm). This high torque value is a quantified measure of implant stability. In molar extraction sites, it is unlikely to obtain optimal levels of bone/implant contact without the use of graft materials and/or membranes. This case described both of the above techniques. Osseointegration occurred uneventfully and the implant was restored approximately 18 weeks post implant placement even though radiographic evidence did not demonstrate complete osseous fill. In the presence of a high ISQ value, the clinician had the confidence to place the definitive restoration.

Dr. Baumgarten received his dental degree, as well as Certificates in Periodontal Prosthetics and Periodontics, from the University of Pennsylvania School of Dental Medicine. He is affiliated with the Academy of Osseointegration and the American Academy of Periodontology. Dr. Baumgarten is a Clinical Professor with the Department of Periodontics at the University of Pennsylvania School of Dental Medicine and maintains a private practice in Philadelphia, Pennsylvania.

*Sinus Lift, Immediate Placement/Provisionalization With NanoTite™ PREVAIL® Implants In The Posterior Maxilla**

Clinical Treatment By Robert Emery, DDS & Benjamin Watkins, DDS (USA)

INITIAL PATIENT PRESENTATION

A 55-year-old male was referred for reconstruction of his posterior maxilla. His chief complaint was, "I must be able to speak and eat in front of my patrons." He also did not want any type of removable prosthetic replacement for the missing teeth. Radiographic and clinical examination revealed acute, localized bone loss around tooth #3; a radiolucency for tooth #5 and significant mobility of the existing fixed partial denture #'s 4-7 (Figures 1 and 2).

DIAGNOSIS

- Class II malocclusion, without dysfunction
- Moderate occlusal abrasion secondary to parafunctional habits
- Recurrent dental caries tooth #'s 4 and 5 (maxillary right premolars)
- Non-restorable fixed partial denture (FPD) #'s 4-7
- Inadequate bone volume for implant placement, maxillary right cuspid
- Severe localized periodontitis tooth #3 (maxillary right first molar)
- Significant maxillary right sinus pneumatization
- Failing endodontic therapy tooth #5

TREATMENT PLAN

- Diagnostic casts, wax patterns, fabrication of laboratory processed fixed provisional restoration tooth #'s 4-7
- Extraction of tooth #'s 3 and 5, alveolar preservation grafts and ridge expansion tooth #6
- Placement of provisional fixed partial denture tooth #'s 2-7
- Healing of osseous defects, maxillary right posterior quadrant
- Extraction and immediate implant placement tooth #4, placement of NanoTite PREVAIL Implants in tooth positions 3, 5 & 6
- Placement of Encode® Healing Abutments and definitive impression
- Immediate loading with a screw-retained provisional restoration
- Placement of Encode Abutments and the definitive prosthesis

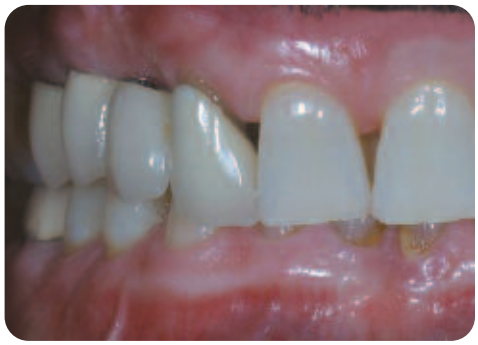
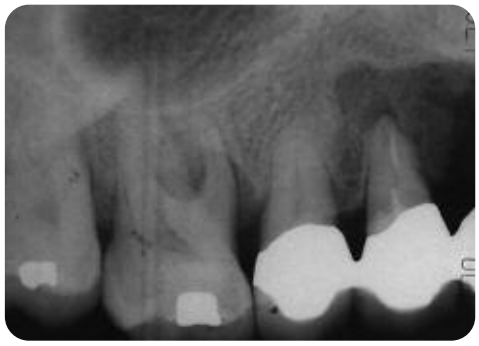


Figure 1



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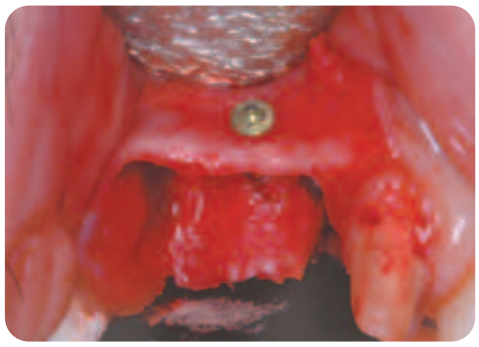

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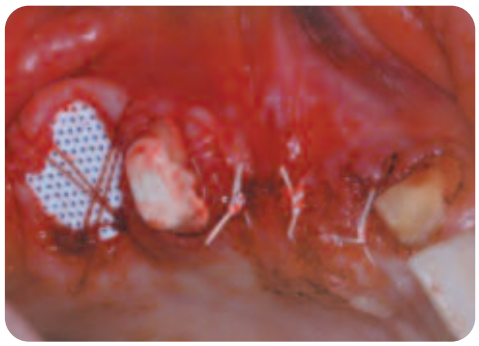
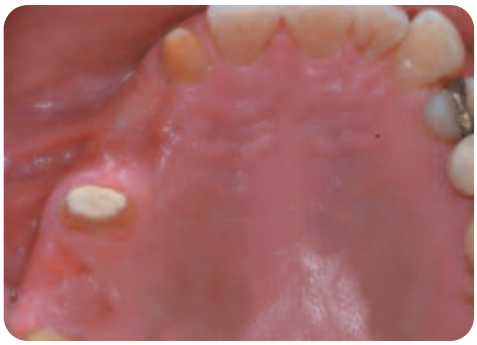


Figure 4

*See back cover



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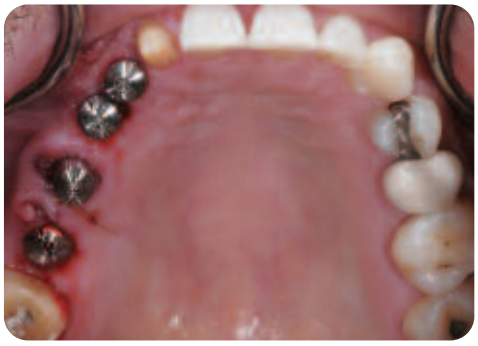

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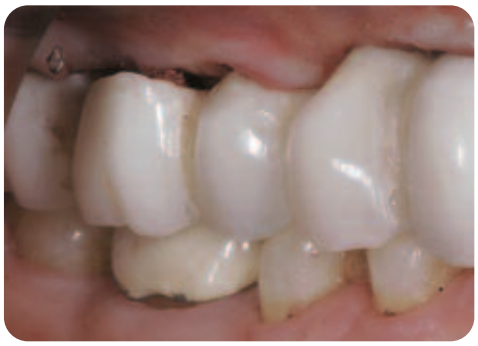

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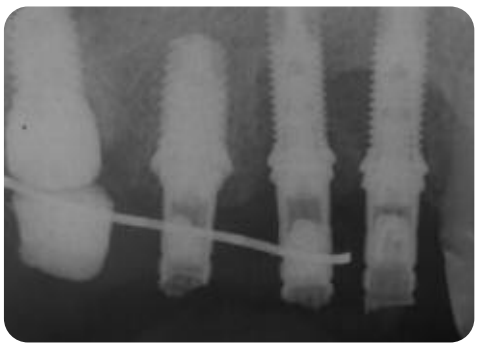

Figure 8

SURGICAL TREATMENT

This case required maintenance of a tooth with a hopeless prognosis (#4) for use as a provisional bridge abutment while the future implant sites underwent osseous healing post extraction, grafting and ridge expansion. The extractions were done in sequence: tooth #'s 3 and 5 were extracted in conjunction with grafting and ridge splitting in the areas of tooth #'s 5 and 6, respectively. A provisional FPD was made, using tooth #'s 2, 4 and 7 as the posterior and anterior abutments. In order to minimize chairtime and future maintenance issues, a laboratory fabricated provisional restoration with metal reinforcement was fabricated by the restorative dentist prior to surgery.

Tooth #'s 3 and 5 were extracted. A Piezosurgery® device was used to split the ridge and the palatal alveolus was expanded. The expansion was maintained with a 1.5mm lag screw (Figure 3). All sites were grafted with mineralized cancellous allograft. In site #6, a resorbable collagen membrane was placed and primary closure was achieved. In site #3, additional fixed, keratinized, attached tissue was desired and a perforated 100% PTFE (polytetrafluoroethylene) membrane was used (Figure 4). The prefabricated provisional FPD was placed and the patient was allowed to function for the four months of bone maturation.

Four months post tooth extraction and grafting, the patient returned for the second surgical phase of treatment: implant placement and implant provisional restoration. The fixed provisional restoration was removed (Figure 5). Tooth #4 was extracted. A small incision was made to remove the lag screw. The surgical guide was indexed to the anterior tooth preparation #7. NanoTite™ PREVAIL® Implants were placed into tooth sites 3, 4, 5 and 6 with a sinus elevation performed in site #3. Composite bone grafts were used to augment the sites. Insertion torque values >35Ncm were obtained in all sites except tooth #3, which had an insertion torque value of 20Ncm. The surgeon placed Encode® Healing Abutments with emergence profiles consistent with the teeth being replaced (Figure 6) and placed intermittent sutures to close the soft-tissue flaps. The patient was then seen by the prosthodontist for restorative treatment.

A definitive impression was made of the Encode Healing Abutments. The abutments were removed and implant temporary cylinders were placed into the internal interface of the implants. The temporary cylinders were adjusted for interocclusal clearance and picked up inside the laboratory processed provisional FPD. Ideal emergence profiles were developed and the provisional FPD was secured with abutment screws torqued to 20Ncm. The provisional restoration had minimal occlusal contacts in centric occlusion. Lateral contacts were eliminated (Figures 7 and 8).

During the osseointegration waiting period, the final Encode® Abutments were fabricated. Three months post implant placement, the provisional restoration was removed. Osseointegration was evaluated by applying 32Ncm of reverse torque to the implants. The patient did not experience any discomfort with this procedure and macroscopic movement was not seen. The implants were considered to be osseointegrated. New implant temporary cylinders were placed into the implants and a verification index was made with autopolymerizing acrylic resin. Impression copings were placed into the internal interface of the implants and an implant level impression was made. A master cast was fabricated in conventional fashion. The definitive crowns were fabricated on the Encode Abutments.

The patient returned for insertion of the abutments and implant crowns. The provisional FPD was removed. The Encode Abutments were seated and the abutment screws were torqued to 20Ncm (Figure 9). Abutment placement was verified with radiographs prior to applying torque to the abutment screws (Figure 10). The access openings were blocked out. The crowns were tried in individually and together and the occlusion was adjusted for both centric and eccentric movements. The crowns were cemented per conventional prosthodontic protocol (Figures 11 and 12).

CLINICAL OVERVIEW

This clinical case demonstrated an accelerated treatment timeline by combining extraction, grafting and placement of a fixed provisional FPD initially supported by teeth. After osseous healing, the hopeless tooth was extracted, implants were placed and immediately restored with an implant-retained provisional FPD. Three months post implant placement, the interim restoration and abutments were removed and replaced with Encode Healing Abutments and individual crowns. Osseointegration and soft-tissue healing occurred at the same time. Total treatment time for this patient was approximately eight months. With the more traditional, earlier protocols, this treatment would likely have taken 18 to 24 months because the treatment steps would have been done individually, in sequence. At least one more surgery would also have been required—uncovering the implants and placement of conventional healing abutments.

Dr. Emery completed his residency program in Oral and Maxillofacial Surgery at the University of Maryland. He is a Senior Attending at Washington Hospital Center in Washington, DC. He lectures extensively both nationally and internationally and maintains a private practice in Washinton, DC.

Dr. Watkins completed the Advanced Prosthodontic Residency Program at the Medical College of Virginia School of Dentistry, and the Fellowship Program in Advanced Implant Prosthodontic Education at the University of Maryland School of Dental Surgery. He is a clinical advisor for Clinical Research Associates and in private practice limited to prosthodontics, in Washington, DC.

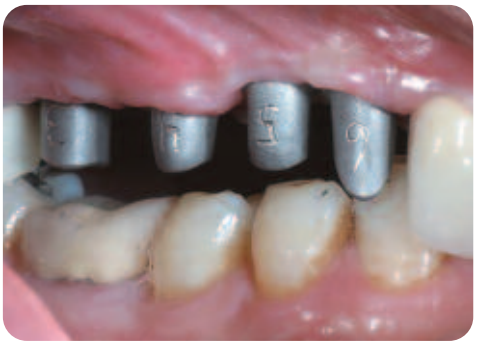

Figure 9

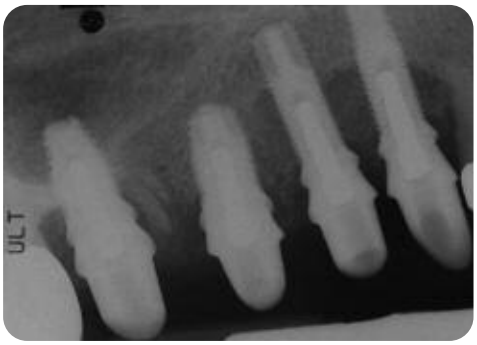

Figure 10

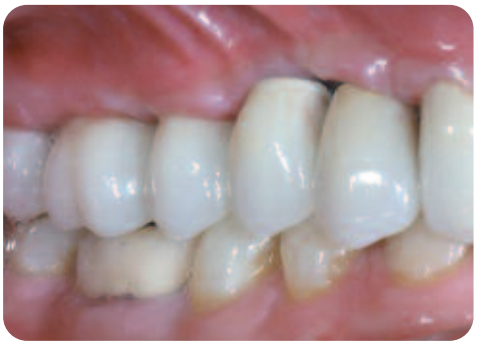

Figure 11

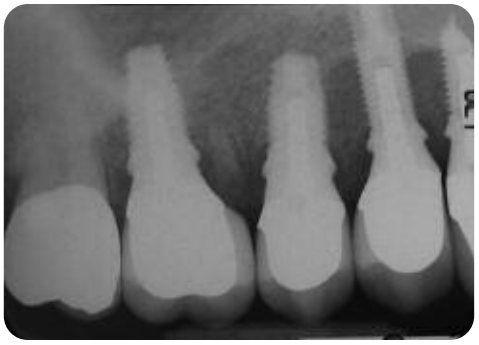

Figure 12

*Placement Of A Short Length NanoTite™ PREVAIL® Implant In The Maxillary Posterior Region To Avoid A Sinus Lift**

Clinical Treatment By Pär-Olov Östman, DDS (Sweden)

INITIAL PATIENT PRESENTATION

A 70-year-old male patient presented to the dental clinic with a chief complaint of, "I have pain in my upper left jaw." Radiographic examination revealed a combined endodontic/periodontal lesion, probably due to root fracture of tooth #13 (maxillary left 2nd premolar) (Figure 1). Tooth #12 had been removed two months earlier due to trauma.

DIAGNOSIS

- Partially edentulous left posterior maxilla
- Adequate ridge width, limited bone height under the sinus for implant placement
- Adequate implant restorative and soft-tissue dimensions
- Adequate interocclusal clearance

TREATMENT PLAN

- Removal of failed fixed partial denture (FPD), extraction of tooth #13 and removal of pontic tooth #14 from bridge (Figure 2)
- Healing for four months
- Placement of two NanoTite PREVAIL Implants (4/5/4mm diameter x 13mm and 8.5mm length)
- Placement of PreFormance® Posts for use as interim abutments
- Immediate loading with a chairside cement-retained provisional FPD
- Osseointegration/soft tissue maturation
- Implant level impression three months post implant placement
- Placement of definitive prosthesis two weeks post impression

SURGICAL TREATMENT

The patient was given local anesthesia (Figure 3) and a full thickness mucoperiosteal flap was reflected in the maxillary left posterior quadrant. Osteotomies were prepared for placement of two NanoTite PREVAIL Implants (4/5/4mm diameter x 13mm and 8.5mm length), with the use of a surgical guide. Bone quality was quantified as Type IV soft bone. The final twist drill was 3.0mm in diameter to optimize bone/implant

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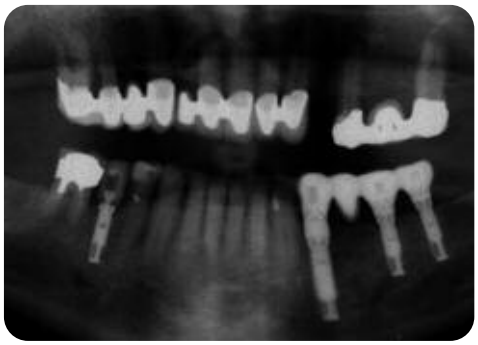
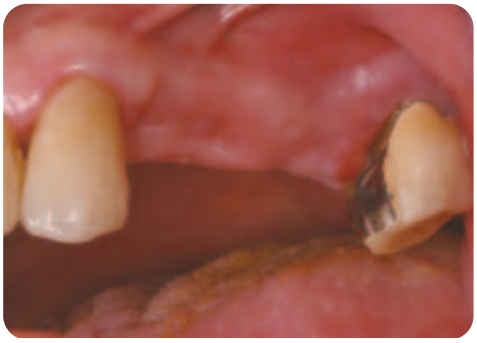


Figure 1



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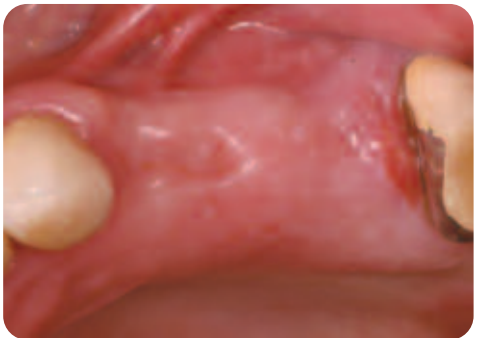

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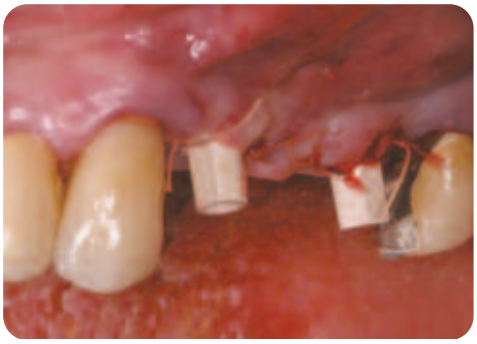


Figure 4

contact and primary stability in an undersized osteotomy. The insertion torque for both implants exceeded 35Ncm. Implant Stability Quotient (ISQ) readings showed high initial stability (12=72 ISQ and 14=68 ISQ). Tooth position #12 received a 4/5/4mm diameter x 13mm length implant and tooth position #14 received a 4/5/4mm diameter x 8.5mm length implant in order to manage the limited bone height under the maxillary sinus without the need for a sinus lift/graft procedure.

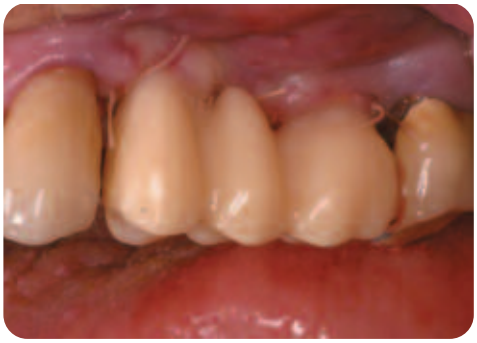
PROVISIONALIZATION

Diagnostic casts and wax patterns were made preoperatively. A translucent vacuum template was made using a 2.5mm thick thermoformed material. The laboratory processed provisional FPD was made with Protemp™ 3 Garant. PreFormance® Posts were chosen: 5mm emergence profile x 4mm height. The interim abutments were prepared extraorally for adequate interocclusal clearance and seated into the internal interface of the implants with audible and tactile clicks to ensure complete seating. These were secured with abutment screws tightened to 20Ncm with a torque driver. The soft-tissue flap was closed with Vicryl® 4.0 interrupted sutures around the PreFormance Posts (Figure 4). A provisional FPD with oversized holes had been prepared before surgery. Autopolymerizing acrylic resin was placed into the prefabricated provisional restoration and inserted onto the PreFormance Posts. The initial set occurred intraorally and final polymerization occurred extraorally. The provisional restoration had occlusal contacts in centric occlusion. It was contoured, polished and placed onto the PreFormance Posts and temporarily cemented (Figure 5). A post insertion radiograph was taken. Since the PreFormance Posts are radiolucent, the implant/abutment interfaces could not be visualized (Figure 6). The patient was given oral hygiene instructions and was discharged with the fixed provisional restoration in place.

RESTORATIVE TREATMENT

Three months post implant placement, the patient returned for evaluation and the definitive impression of the implant restorative platforms (Figure 7). The provisional restoration and PreFormance Posts were removed (Figure 8). Excellent soft-tissue healing around the PreFormance Posts (PEEK-polyetheretherketone) was noted. The periimplant soft tissues healed consistent with the shape of the interim abutments and provisional restoration.

Certain® Pick-up Implant Impression Copings were placed into the internal interfaces of the implants with audible and tactile clicks to confirm complete seating (Figure 9). An impression was made of the copings with high-viscosity polyvinylsiloxane



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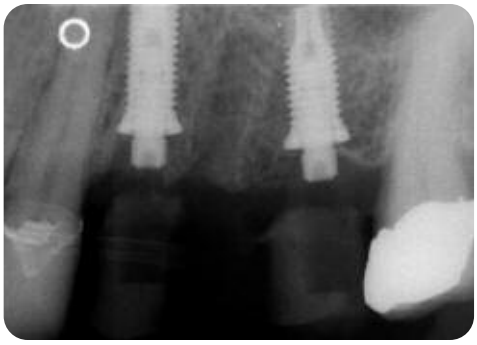

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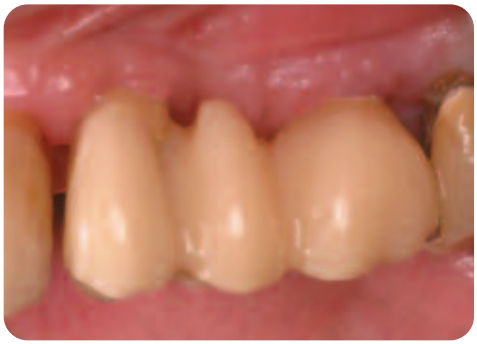

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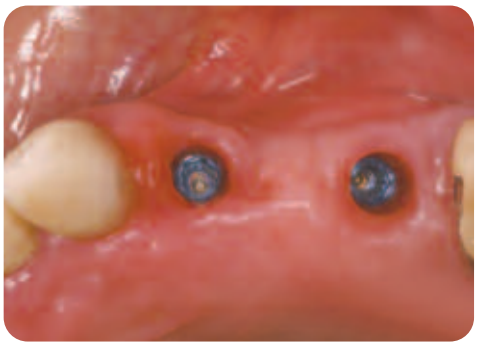

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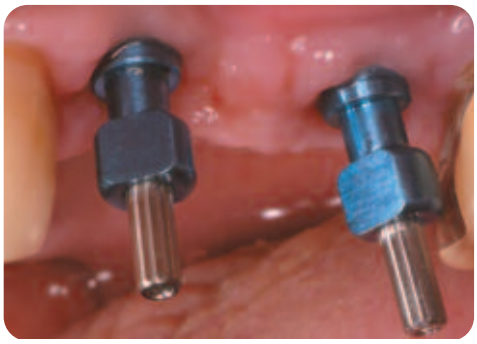

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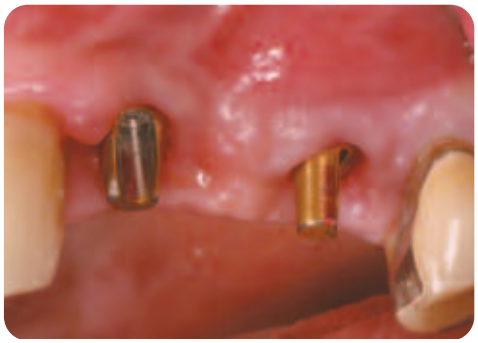

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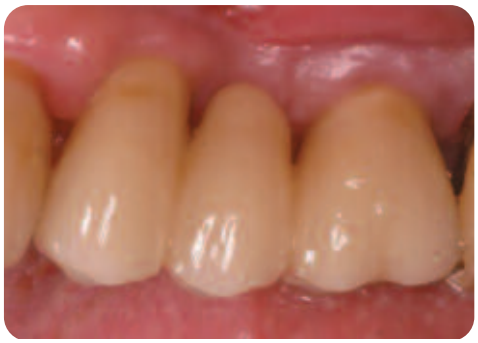

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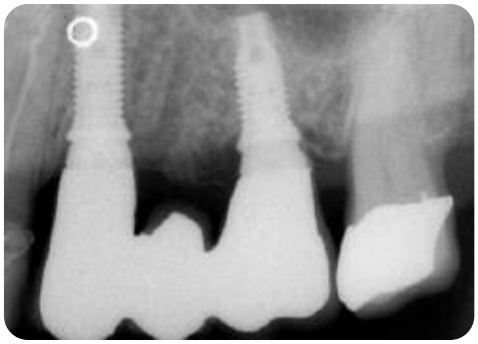

Figure 12

impression material. An alginate impression was made of the opposing arch. The impressions, an interocclusal registration and shade selection were sent to the laboratory.

In the laboratory, a master cast was developed according to conventional prosthodontic protocols. Pre-angled, pre-machined titanium alloy abutments, GingiHue® Posts, were chosen consistent with the size of the missing teeth, the orientation of the implants and the emergence profiles established by the interim abutments and provisional restoration. The definitive FPD was fabricated and returned for insertion.

The patient was seen two weeks after the definitive impression for insertion of the definitive abutments (Figure 10) and FPD. Gold-Tite® Abutment Screws were placed to secure the prepared GingiHue Posts to the implants and tightened to 20Ncm with a torque driver. The FPD was tried in, adjusted interproximally and for optimal occlusal contacts in centric and eccentric positions. The definitive restoration was cemented with RelyX™ Unicem (Figure 11).

A post-insertion radiograph was taken that demonstrated both implant restorative platforms were consistent with the levels of the osseous crest in both implant sites (Figure 12).

CLINICAL OVERVIEW

This clinical case demonstrates the placement of two NanoTite™ PREVAIL® Implants and immediate loading of a fixed provisional restoration in the posterior maxilla. This implant design features the enhanced NanoTite Implant Surface to the top of the implant collar. The result was that the patient was treated expeditiously with a less invasive surgical protocol due to placement of a short implant under the maxillary sinus, eliminating the need for sinus lift and grafting.

Dr. Ostman received his dental degree from the University of Umeå Dental College, Umeå, Sweden. He is head of "Team Holmgatan" private practice clinic in Falun, Sweden and a Research Fellow at Department of Biomaterials, Institute for Surgical Sciences, Sahlgrenska Academy, Göteborg University, Göteborg, Sweden.

NanoTite™ Implant Ordering Information

NanoTite Certain® PREVAIL®

Length	3/4/3mm(D)	4/5/4mm(D)	5/6/5mm(D)	4/3mm(D)**	5/4mm(D)**
8.5mm	NIIOS3485	NIIOS4585	NIIOS5685	NIIOS4385	NIIOS5485
10mm	NIIOS3410	NIIOS4510	NIIOS5610	NIIOS4310	NIIOS5410
11.5mm	NIIOS3411	NIIOS4511	NIIOS5611	NIIOS4311	NIIOS5411
13mm	NIIOS3413	NIIOS4513	NIIOS5613	NIIOS4313	NIIOS5413
15mm	NIIOS3415	NIIOS4515	NIIOS5615	NIIOS4315	NIIOS5415

NanoTite Certain PREVAIL Implant

NanoTite Certain Implant

NanoTite External Connection Implant

Length	NanoTite Certain 3.25mm(D)	NanoTite Certain 4.0mm(D)	NanoTite Certain 5.0mm(D)	NanoTite Certain 6.0mm(D)	NanoTite External Connection 3.25mm(D)**	NanoTite External Connection 4.0mm(D)**	NanoTite External Connection 5.0mm(D)**	NanoTite External Connection 6.0mm(D)**
7.0mm	N/A	N/A	N/A	N/A	N/A	NOSS407	NOSS507	NOSS607
8.5mm	NIOSM385	NIOSS485	NIOSS585	NIOSS685	NOSM385	NOSS485	NOSS585	NOSS685
10mm	NIOSM310	NIOSS410	NIOSS510	NIOSS610	NOSM310	NOSS410	NOSS510	NOSS610
11.5mm	NIOSM311	NIOSS411	NIOSS511	NIOSS611	NOSM311	NOSS411	NOSS511	NOSS611
13mm	NIOSM313	NIOSS413	NIOSS513	NIOSS613	NOSM313	NOSS413	NOSS513	NOSS613
15mm	NIOSM315	NIOSS415	NIOSS515	NIOSS615	NOSM315	NOSS415	NOSS515	NOSS615
18mm	NIOSM318	NIOSS418	N/A	N/A	NOSM318	NOSS418	NOSS518	NOSS618

*For surgical placement in the upper or lower jaw to provide a means for prosthetic attachment in single tooth restoration and in partially or fully edentulous spans with multiple single teeth, or as a terminal or intermediary abutment for fixed and removable bridgework and to retain overdentures. When a minimum of 4 implants, ≥10mm in length, are placed in the mandible and splinted in the anterior region, immediate loading of NanoTite Implants is indicated. NanoTite Implants may also be immediately restored using PreFormance® Provisional Components in specified protocols.

**US availability pending 510(k) clearance.

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