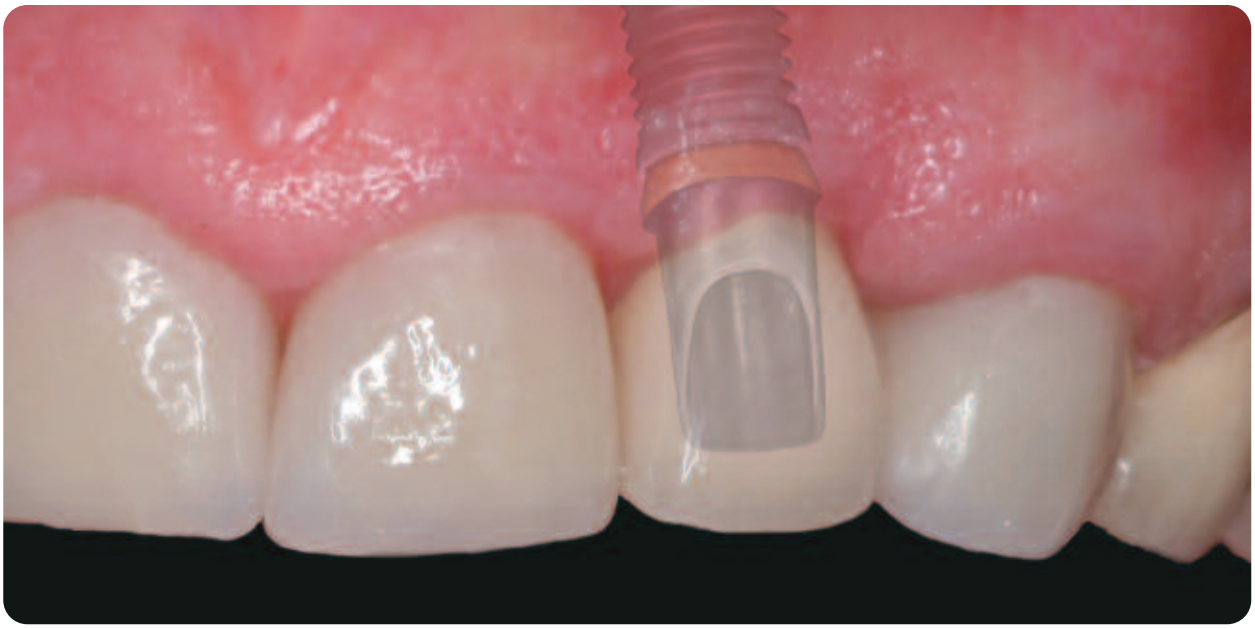


Clinical Perspectives

Volume 6, Issue 2

NanoTite™ PREVAIL® Implants: Crestal Bone Preservation In The Aesthetic Zone

By Pär-Olov Östman, DDS†
Sweden

As implant dentistry continues to evolve to meet our patient's demands for aesthetic tooth replacements with minimal downtime or inconvenience, the dental implant industry has responded with new technological advancements and research. For example, the development of enhanced implant surfaces, such as the OSSEOTITE® Dual-Acid-Etched Implant Surface, improved on the results seen with machined surfaced implants. Studies demonstrated long term Cumulative Survival Rates (CSRs) with OSSEOTITE Implants in the range of 95%-98%[1-3] (at five years[4]) which represented an improvement over the CSRs of machined surfaced implants (85%-95%).[5,6]

With OSSEOTITE Implants in our armamentarium, we felt confident to perform early loading protocols and to place implants in compromised clinical situations. With multi-center, long term prospective studies and the ten year history of OSSEOTITE, good long term success with negligible periimplant concerns has been demonstrated.[3] With such positive results, why do researchers and the dental implant industry continue to look for advancements in implant surface technology and designs?

Implants typically demonstrate good initial primary stability at the time of placement, as can been confirmed with high ISQ (Implant Stability Quotient) Readings. This is a mechanical phenomenon. However, when bone remodels in the first few weeks following implant placement, primary implant stability can degrade with initial bone resorption which in turn might impact our ability to successfully perform immediate loading protocols. To potentially address this concern, new nanotechnology in implant surface topography has been explored. BIOMET ***3i*** has applied nano-scale crystals of calcium phosphate onto the OSSEOTITE Surface by using a Discrete Crystalline Deposition™ (DCD™) Process. This process creates a more complex surface topography which renders it a Bone Bonding™ Surface by the interlocking of the newly formed cement line matrix of bone with the implant surface. The result: the NanoTite Implant has been developed and introduced to the profession.

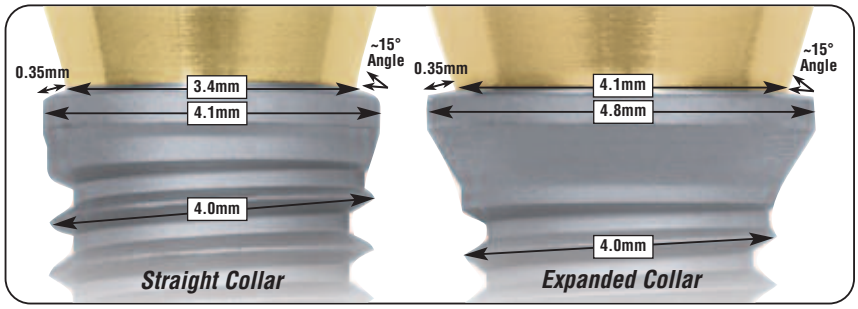
So Why Choose NanoTite?

The preclinical (animal) studies performed with the NanoTite Surface have demonstrated more rapid bone formation with improved bone-to-implant (BIC) contact. This has now been confirmed with human histology.[7,8] What is the significance of these findings in clinical practice? Clinicians could immediately load the implant and could potentially treat patients even in compromised clinical situations, such as poor bone quality, limited bone quantity, or in grafted sites. In our practice "Team Holmgatan" in Falun, Sweden, we have shifted from placing OSSEOTITE Implants to NanoTite Implants in all locations and indications. Even though we have seen great success with OSSEOTITE Implants, we believe it is far more advantageous to place implants with the most technologically advanced surface. Therefore, we choose NanoTite Implants for all clinical situations where implant therapy is indicated.

What About Crestal Bone Preservation?

Preservation of crestal bone has proven to be critical for long term implant success. This is especially true in the anterior aesthetic zone for support of the periimplant soft tissues, as well as in areas of limited bone height so as to maximize bone-to-implant contact. One new implant design available today, such as the NanoTite PREVAIL Implant (Figure), has built in Platform Switching™ with the OSSEOTITE Surface and DCD Process to the top of the implant collar at the medialization point, creating a continuous bone-loading surface. This implant has been designed with straight and expanded collar configurations. The straight collar configuration is ideally suited for sites with limited restorative space, such as missing maxillary lateral incisors or mandibular anteriors. Placement of the PREVAIL Implant in this clinical situation should provide a more predictable outcome from an aesthetic point of view. The expanded collar configuration is indicated for sites where engagement of the crestal cortical plate of bone is required to achieve a high level of primary stability.

The *Clinical Case Presentation* to follow demonstrates the placement of a straight collar NanoTite PREVAIL Implant in a maxillary lateral incisor location, utilizing an immediate provisionalization protocol. The patient demanded an aesthetic, non-removable replacement for her missing tooth with minimal downtime or inconvenience. Implant therapy is a life-long, long-lasting treatment and therefore we believe we should place implants with the most advanced surface technology and design to enhance outcomes, decrease treatment times, improve patient satisfaction and increase referrals.



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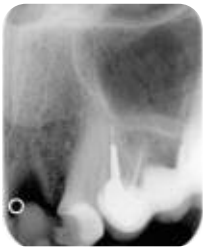
Immediate Provisionalization Of A NanoTite™ PREVAIL® Implant In The Aesthetic Zone: A Case Presentation

Clinical Treatment By Pär-Olov Östman, DDS

INITIAL PATIENT PRESENTATION

A 62-year-old female patient presented to the dental clinic missing the maxillary left lateral incisor due to trauma. The previous dentist fabricated a fixed partial denture (FPD) which was placed immediately after tooth extraction by bonding a denture tooth to the adjacent natural teeth (Figure 1). The initial treatment plan presented to the patient included replacement of the missing tooth with a conventional three unit FPD. However, the patient was skeptical about having "conventional bridge treatment" due to her dislike of the aesthetics of the provisional FPD, as well as information she obtained by doing her own research on the internet about conventional dentistry versus the more long term benefits of dental implant therapy. The patient therefore came to the clinic with the desire to have a new treatment plan that included a single tooth dental implant restoration and crowns on the adjacent natural teeth so she could have an improved appearance.



DIAGNOSIS

- Partially edentulous maxillary left quadrant (missing maxillary left lateral incisor, tooth #10)
- Adequate bone quality and quantity for implant placement
- Limited restorative space in tooth site #10 for an implant retained crown
- Adequate soft tissue dimension
- Adequate interocclusal clearance with the opposing natural dentition

TREATMENT PLAN

- Fabrication of a diagnostic cast and wax patterns
- Removal of the bonded FPD, preparation, impressions and chairside fabrication of a ProTemp™ provisional FPD from teeth #'s 7-11.
- Placement of IPS Empress® Crowns teeth #'s 7, 8, 9 and 11.
- Placement of a NanoTite PREVAIL Implant (4/3mm diameter x 15mm length) in the maxillary left lateral incisor site, one day later
- Placement of a PreFormance® Post for use as an interim abutment
- Immediate provisionalization of the implant with a chairside processed provisional restoration
- Osseointegration/soft tissue maturation
- Implant level impression three months post implant placement
- Placement of an all-ceramic definitive restoration

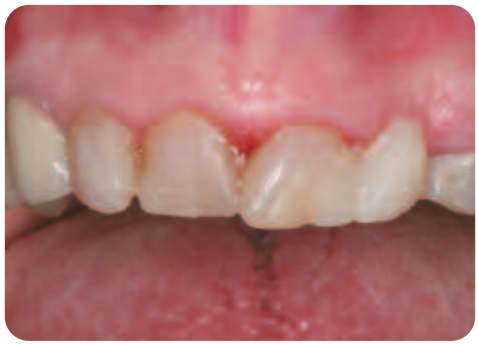


Figure 1

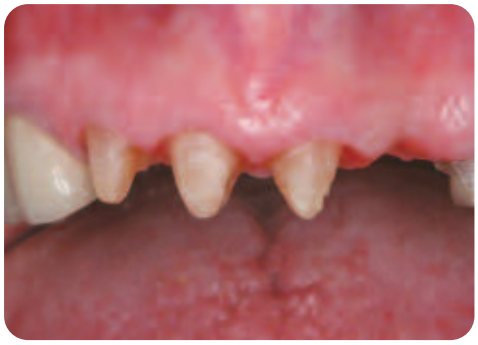


Figure 2

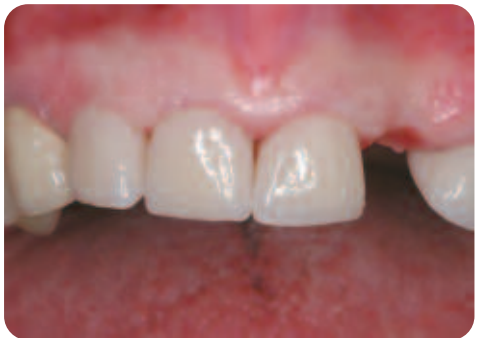
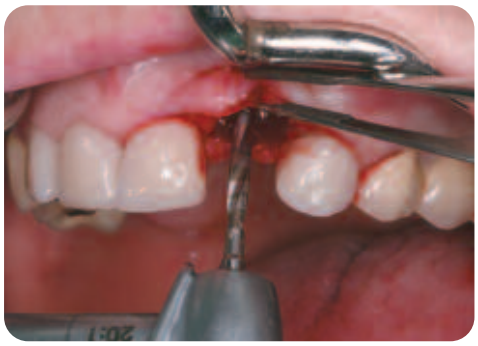


Figure 3



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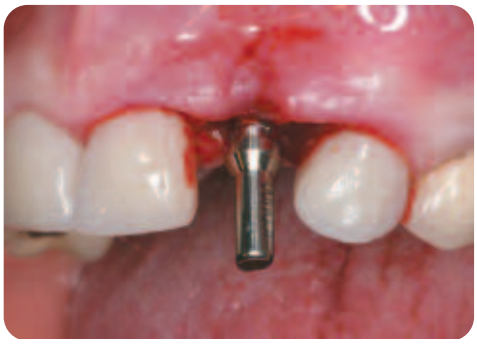

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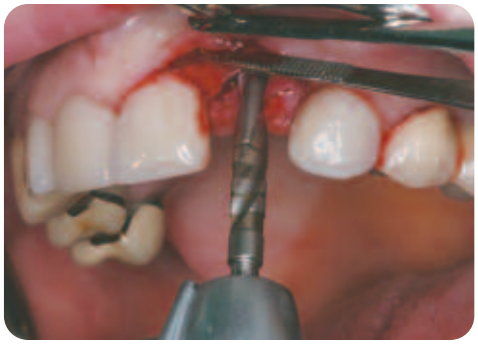

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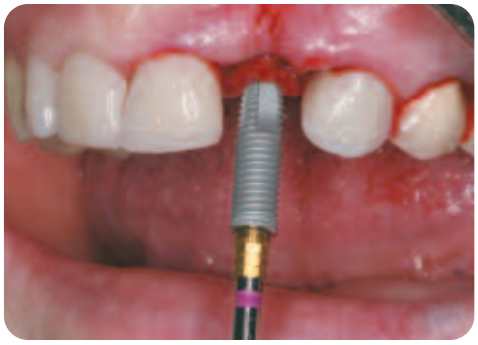


Figure 7

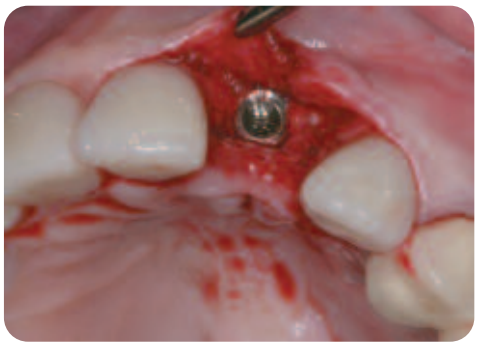


Figure 8

PRESURGICAL TREATMENT

Following the patient's acceptance of the new treatment plan, which included dental implant therapy and aesthetic restorations for the adjacent natural teeth in the maxillary anterior segment, the aesthetically compromised bonded provisional FPD was removed from teeth #'s 9 and 11, the maxillary left central incisor and cuspid. Maxillary anterior teeth #'s 7, 8, 9 and 11 were prepared for full coverage crown restorations (Figure 2).

Before tooth preparation, an alginate impression was made and a ProTemp™ provisional restoration was fabricated chairside supported by teeth #'s 7, 8, 9 and 11. Prior to placement of the provisional bridge a second impression was made with a quick-setting high-viscosity polyvinylsiloxane (Dimension™ Penta™ H Quick, 3M ESPE, St. Paul, MN, USA), along with an impression of the opposing arch, an interocclusal registration and shade selection. These were sent to the dental laboratory with instructions for fabrication of all ceramic IPS Empress® Crowns (Ivoclar Vivadent, Inc., Amherst, NY). One week later, the provisional FPD was removed and the definitive Empress Crowns were placed onto the prepared natural teeth (Figure 3).

SURGICAL TREATMENT

Following placement of the Empress Crowns, the patient received local anesthesia by infiltration in the maxillary left quadrant. A minimal flap was elevated in the maxillary left lateral incisor region with careful attention to maintain the integrity of the interdental papillae surrounding the newly placed crowns on the adjacent natural teeth.

The osteotomy was prepared following the manufacturer's recommended protocol for placement of a 4/3mm diameter by 15mm length NanoTite™ PREVAIL® Implant. The straight collar configuration was chosen rather than the expanded collar to maximize the potential to preserve the crestal bone height especially on the buccal aspect and to manage the smaller restorative space in the maxillary lateral incisor region. After initial penetration of the bone crest with a round drill to mark the ideal implant location, a 2mm diameter twist drill was used with copious amounts of irrigation (Figure 4).

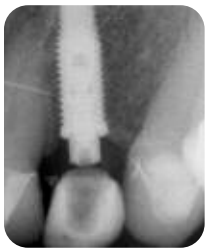
Next, a surgical guide pin was placed into the site to confirm the location of the implant position and angulation (Figure 5). The crestal bone dimension measured 6mm. A 3mm diameter twist drill was used for the chosen implant length and advanced to the full predetermined depth (Figure 6). The straight collar configuration of the PREVAIL Implant did not necessitate the use of a shaping drill or countersink, therefore, the implant was placed immediately into the prepared osteotomy (Figure 7).

The insertion torque of the implant reached the torque limit preset on the drilling unit (45Ncm). Since this number exceeded the minimum recommended insertion torque for the INOL (immediate non-occlusal loading) protocol[1], the Certain® Implant Driver Tip was removed from the internal interface of the implant (Figure 8). An Osstell™ Smartpeg™ designed for the Certain connection was placed. An Implant Stability Quotient (ISQ) reading indicated a high

level of initial implant stability (76). Since the patient requested an immediate fixed restoration and the implant achieved the minimum torque and ISQ values, the decision was made to fabricate an immediate provisional restoration.

PROVISIONALIZATION

An appropriate sized PreFormance® Post (PEEK-polyetheretherketone) was selected for use as an interim abutment. The selected post (4mm collar height with a 15 degree angle) was placed into the internal interface of the implant with an audible and tactile click to ensure complete seating and retained with an abutment screw tightened to 20Ncm of torque (Figure 9). The PreFormance Post was prepared intraorally for adequate interocclusal clearance and parallelism. Single sutures were placed to close the soft tissue flaps with 4.0 Vicryl® Sutures (Figure 10).



A prefabricated crown shell (Fresaco, Tettnang, Germany) was placed onto the prepared post and filled with composite resin in a matching color (Ceram X™, DENTSPLY, Konstanz, Germany). An optimal emergence profile was developed within the provisional restoration. The crown was contoured and polished, then cemented with Provicol QM (VOCO America, Inc., Sunnyside, NY) temporary cement. Care was taken to prevent the material from entering the flap by not overfilling the provisional crown. No bonding was done so the provisional crown could be easily removed without contaminating the surgical site. The provisional restoration had no occlusal contacts in centric occlusion following the principals of immediate non-occlusal loading. There were no contacts in lateral working and balancing movements.

A post insertion radiograph was taken. Since the PreFormance Post is radiolucent, the implant/abutment interface was not visualized (see periapical radiograph). The patient was given oral hygiene instructions and discharged with the fixed provisional restoration in place (Figure 11).

Clinical Tip: A post insertion radiograph is important to identify the baseline bone levels immediately post implant placement. With cement-retained provisional restorations, the post insertion radiograph can also be used to ascertain that all the cement has been removed from the surgical site.

RESTORATIVE TREATMENT

Three months post implant placement and immediate provisionalization, the patient returned for evaluation of osseointegration and soft tissue contours, and for the definitive impression of the implant restorative platform (Figure 12). The provisional crown was removed. Excellent soft-tissue healing around the PreFormance Post was noted (Figure 13). The interim abutment was removed and a 3.4mm platform diameter Certain® Implant Pick-Up Impression Coping was placed into the internal interface of the implant (Figure 14). An audible and tactile click indicated the impression coping was completely seated into the implant. A verification radiograph was taken to visually confirm that the impression coping was accurately seated.

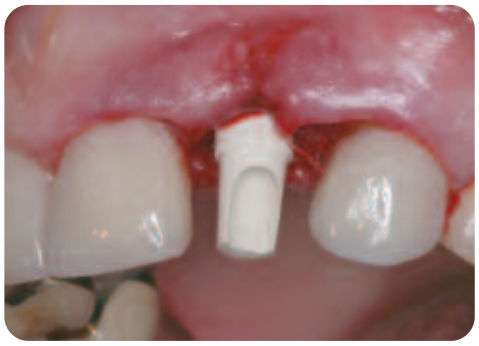


Figure 9

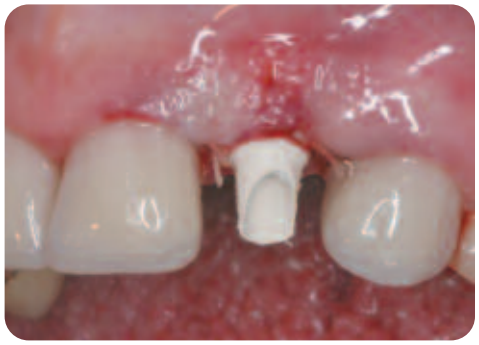


Figure 10

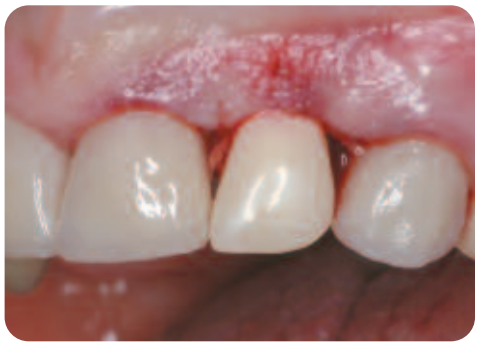


Figure 11

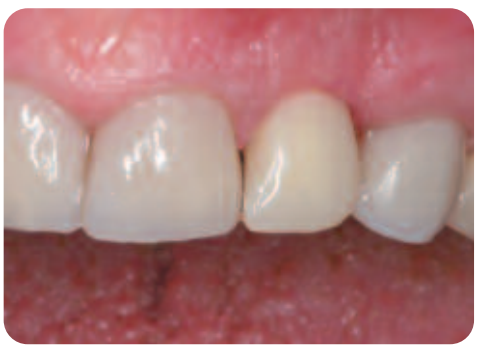
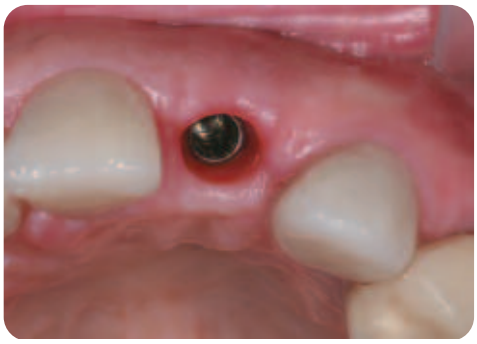


Figure 12



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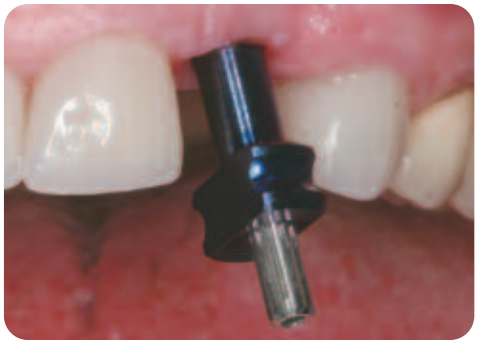

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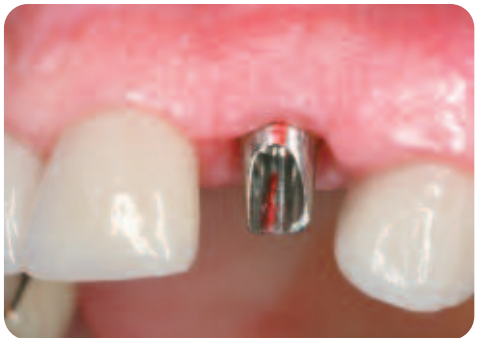


Figure 15

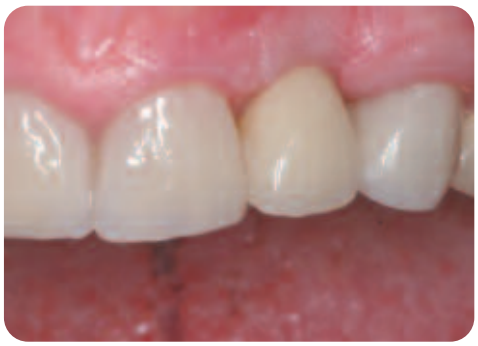
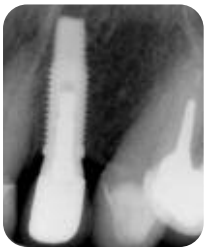


Figure 16

A definitive polyvinylsiloxane impression was made of the implant, as well as an alginate impression of the mandibular dentition. The impressions were sent to the dental laboratory along with an interocclusal registration and shade selection. The master cast was made per conventional prosthodontic protocol. A pre-machined 2mm collar height x 15 degree Pre-Angled GingiHue® Post was selected and placed onto the master cast and secured with a laboratory try-in screw. Minor adjustments were made on the abutment relative to interocclusal clearance, retention and resistance form. The margin on the collar was prepared following the gingival contours. A Denzir® Cad.esthetics® System (Skellefteå, Sweden) all ceramic crown coping was fabricated.

At the insertion appointment, the provisional crown and interim abutment were 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 15). The abutment was secured with a Gold-Tite® Abutment Screw tightened to 20Ncm with a torque driver. The crown was tried-in, adjusted interproximally and for optimal occlusal contact in centric and eccentric positions. A verification radiograph was taken to verify that the crown was seated onto the abutment and the abutment was completely seated into the implant. The definitive restoration was cemented with RelyX™ Unicem (Figure 16).



A post insertion radiograph was taken that demonstrated the implant restorative platform was consistent with the level of the osseous crest in the implant site.

CLINICAL OVERVIEW

This clinical case demonstrates the placement of a straight collared NanoTite™ PREVAIL® Implant in the maxillary anterior segment that was immediately restored with an interim abutment (PreFormance® Post) and a fixed provisional restoration. The implant achieved a high insertion torque and an acceptable ISQ value at the time of implant placement. Healing occurred uneventfully. This implant design features the enhanced NanoTite Implant Surface to the top of the implant collar. The straight collared PREVAIL configuration was selected in this case to preserve the crestal and buccal bone heights, in an effort to maximize the aesthetic outcome of the definitive restoration by preserving the overlying interdental papillae and soft tissue. The result was that the patient was treated expeditiously with an implant-supported provisional crown on the same day as implant placement. The adjacent natural teeth were treated independent of the implant-supported crown to meet the patient's demands for an aesthetic smile.

REFERENCE:

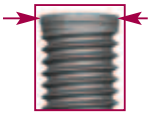
1. Drago CJ, Lazzara R. A clinical report on the immediate provisional restoration of OSSEOTITE® Implants: 18-month results. *Int J Oral Maxillofac Implants* 2004; 19: 534-541.

For more information on this Clinical Case Presentation and to view the treatment videos, go to www.biomet3i.com and click on *In The Operatory.*

Ordering Information

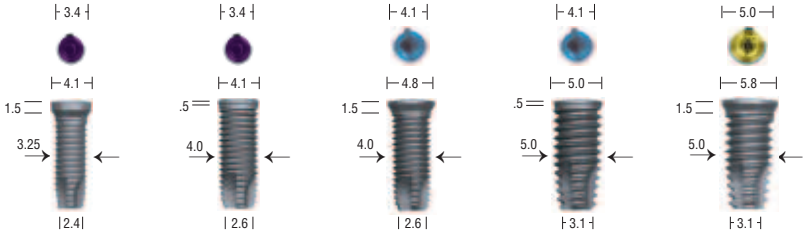
NanoTite™
IMPLANT SYSTEM

Full NanoTite Surface

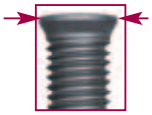


Straight Collar

NanoTite PREVAIL® Implants



Full NanoTite Surface



Expanded Collar

Length	3/4/3mm (P)	4/3mm (P)	4/5/4mm (P)	5/4mm (P)	5/6/5mm (P)
8.5mm	NIIOS3485	NIIOS4385	NIIOS4585	NIIOS5485	NIIOS5685
10.0mm	NIIOS3410	NIIOS4310	NIIOS4510	NIIOS5410	NIIOS5610
11.5mm	NIIOS3411	NIIOS4311	NIIOS4511	NIIOS5411	NIIOS5611
13.0mm	NIIOS3413	NIIOS4313	NIIOS4513	NIIOS5413	NIIOS5613
15.0mm	NIIOS3415	NIIOS4315	NIIOS4515	NIIOS5415	NIIOS5615
Cover Screw Flat (included)	IMCSF34	IMCSF34	ICSF41	ICSF41	ICSF50
Cover Screw Headless	N/A	N/A	ICS275	ICS275	ICS275
Cover Screw 1mm(H)	IMMCS1	IMMCS1	ICS375	ICS375	ICS500

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