Technology Makes a Complicated Implant Restoration Simple

Timothy Kosinski, DDS

INTRODUCTION

The use of dental implants has become an important method for restoring missing teeth with function and aesthetics. Patients now request this type of therapy. The direct benefits provided by implant dentistry include predictably restoring edentulous areas with fixed dentition; minimizing future bone resorption that naturally occurs following tooth loss; increased self confidence when smiling, speaking and kissing; and better health due to improved nutrition and proper digestion. The mouth can be restored as closely as possible to its natural state. Natural biting and chewing capacity is restored, and the integrity of the facial structure is maintained. Since our patients are more discerning about their disposable income, especially during these tough economic times, and how they want to look and feel younger, implant dentistry may prove to be the single most important treatment modality for replacing missing teeth today. As the population becomes more aware of dental implants, their use in our practices will increase dramatically.

TODAY'S IMPLANT DENTISTRY IS PROSTHETICALLY DRIVEN

Surgical placement of dental implants involves a comprehensive understanding of both the surgical and prosthetic applications. Just knowing the techniques involved in drilling an implant or making an impression is just not enough. Today's implant dentistry is prosthetically driven, meaning there must be a clear understanding and visualization of the completed restorative case prior to any surgical intervention. Dentists surgically placing implants must have a clear understanding of the anatomic considerations for each individual case. This includes the position of nerves, sinuses and undercuts. The thickness, position, and angulation of bone must be studied and the integrity of the buccal and lingual plates clearly understood. The aesthetic zone of the anterior maxilla is critical to an acceptable restoration. Simply placing a dental implant where there is adequate bone and then putting a white tooth on top of it may no longer be acceptable. Smile design and emergence profile have developed into an art unto itself. There needs to be an understanding that in some situations grafting procedures may need to prepare the bone site prior to implant placement. Therefore, limitations need to be accepted, and dentists who may be uncomfortable with certain procedures or not confident enough to attain the appropriate final result should embrace the referral process. Complications may arise in any surgical protocol, so there needs to also be an understanding on treating of postoperative complications such as treatment of a dehiscence or fenestration and infections.

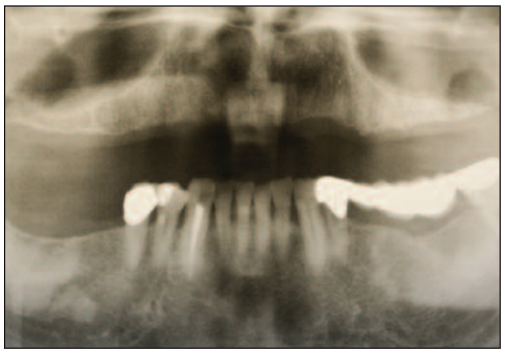

Figure 1. Panoramic radiograph of the patient's edentulous maxilla.

Figure 2. Facial view of edentulous maxilla opposing natural dentition.

REASONS WHY DENTISTS ARE NOT CURRENTLY PLACING IMPLANTS

There are several reasons why dentists are not currently placing dental implants in their practices. There is a fear that complications may occur, vital anatomy damaged or a fear of a procedure that they may not be comfortable with. There needs to be a clear understanding of the benefits, risks, and techniques associated with implant dentistry. Confidence with surgical and prosthetic implant procedures is the result of education and repetition. Simple 2-dimensional (2-D) images created using conventional radiographic techniques may no longer be an adequate and predictable technique for proper implant placement. Computed tomography (CT) diagnosing and preparation of any case can help the practitioner guarantee success since all the fears can be alleviated prior to any surgical intervention. CT scanning is a remarkable tool in the diagnosing of implant position and placement. Scanning software allows for fabrication of precise planning and surgical guides which nearly ensure a positive result. Communication with the patient concerning this innovative therapy reduces anxiety of an unknown procedure and increases treatment acceptance. Reconstruction is made simpler since implants are ideally placed. Our newest computer software allows us to simulate the placement of implants accurately without ever touching the patient.

LESS INVASIVE FLAPLESS PROCEDURES ARE EASIER ON THE PATIENT

Flapless surgical placement of dental implants has become more popular as technology and digital radiography have allowed us to visualize the underlying anatomy more effectively. Flap design, however, still needs to be available for a backup during complications. Management and treatment of implant failures and the potential problems and defects created need to be evaluated and potentially planned for. Regular evaluations are a necessary part of the total implant dentistry practice; this includes hygiene, visual oral and radiographic examination. Maintenance is critical to the long-term positive prognosis of any dental restoration. The prosthesis must be designed in such a way that the patient can maintain it not only today but in the future.

The newest cone beam 3-dimensional (3-D) dental imaging systems provide the dentist with complete information on the vital anatomy in the areas to be considered for dental implants by producing a 3-D view of all the oral structures. This helps us create an accurate treatment plan and increases our chances for a predictable surgical and prosthetic result. The high resolution volumetric images give us for the first time 3-D views of bone and tooth structure and ori-

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entation.[1] Implant type, size, shape, and position are determined prior to any surgical intervention on the patient. Any bone irregularities or deformities are determined. Without elongation or magnification of conventional radiographs, CT allows us to simply become better diagnosticians and surgeons.

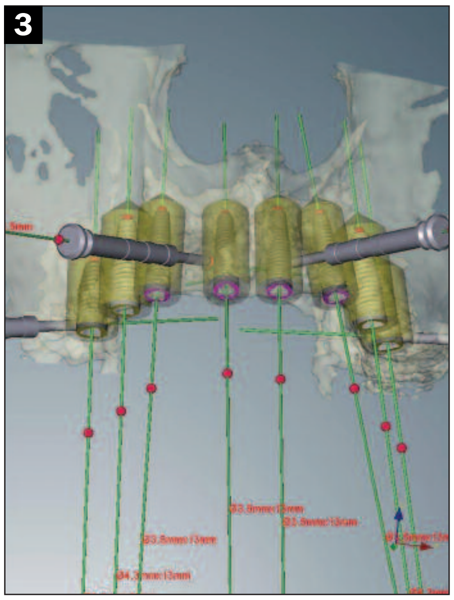
FINAL TOOTH POSITIONS MUST BE ESTABLISHED BEFORE ANY SURGICAL INTERVENTION

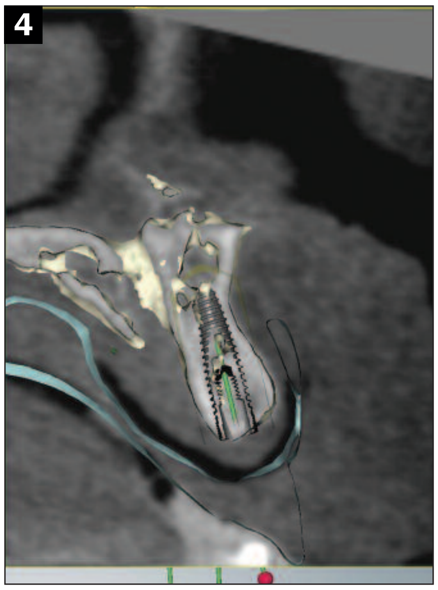
CT scanning is becoming more prevalent for use in ensuring proper dental implant placement. The 2-dimensional images provided by bitewings, periapicals, panoramic, or even medical CT scans may not be enough in diagnosing complicated or challenging situations. One of the latest CT planning software applications (NobelGuide CT [Nobel Biocare]) provides as much information as possible to assist during surgical planning. We can now visualize vital anatomy in 2-D and 3-D prior to surgery, and can assess the location of implants virtually prior to any surgical intervention. The possibility of knowing where tooth restorations need to be located is critical. Diagnosing any anatomic issues specific to the patient, planning the implant type, determining position and orientation in the bone area are all easily accomplished with help of the NobelGuide system.[1] The process is user friendly and intuitive.

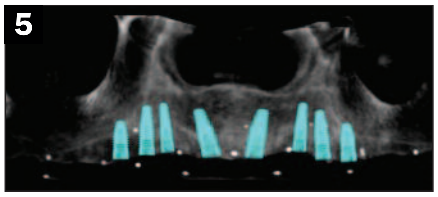
CT PLANNING SOFTWARE HELPS MOTIVATE PATIENT TO CONSIDER IMPLANT RECONSTRUCTION

CT scans generate volume images from digitized information, resulting an axial, panoramic, and cross sectional relationships. Since there is no distortion of the images, accurate measurements can be made directly from the CT information.[2]

The NobelGuide CT scanning software as demonstrated here allows us to simulate the placement of implants accurately before ever touching the patient. A surgical guide, created from the 3-D images, helps place the implant in the proper position depending on the type of prosthesis chosen, without the need for any flap incisions. This technique proves to be a cost effective solution to assist the implant dentist in planning an aesthetic final result and minimizing any surgical challenges that are faced. The CAD/CAM NobelGuide planning and







Figures 3 to 5. Computed tomography (CT) digital plan illustrates panoramic cross sectional and axial views, as well as 3-dimensional (3-D) rendering of the patient's maxilla. Simple panoramic radiographs or periapicals do not give the 3-D images achieved with CT scanning.

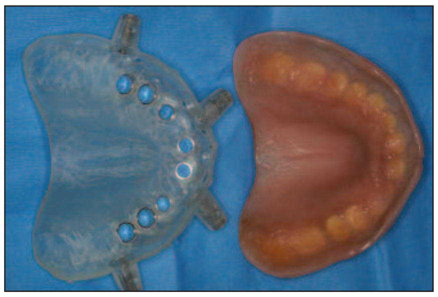


Figure 6. A surgical guide was made from a duplication of the patient's proper fitting and aesthetic conventional maxillary complete denture.

Figure 7. The CAD/CAM fabricated surgical stent with precise surgical guide sleeves in placed in the mouth and retained with pins.

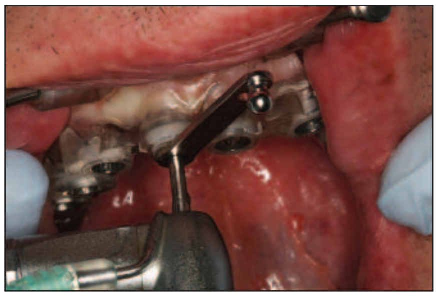


Figure 8. Guiding keys of various diameters were used to precisely make the primary depth determination into bone.

Figure 9. A tissue punch was used to excise the soft tissue from the site in a clean manner. This prevented any soft tissue from resting in the osteotomy site prior to implant placement.

placement system provides a high level of comfort and safety for the patient by reducing surgical and restorative time.[1] Patients are positively influenced by the concept of virtual placement, safety, and ease of surgery of implants in a procedure that they may psychologically feel is extremely invasive. CT scanning, diagnosis, and guided procedures have elevated implant dentistry to a realm that any dentist who develops an interest in growing professionally can certainly accomplish.

Prior to the CT scan, a radiographic guide is fabricated from a duplication of the patient's properly fitting and contoured maxillary complete denture. It is wise to have patient acceptance of the prosthesis prior to CT scanning, so that information can be built from a positive starting point. This will serve to aid in the visualization of the optimal prosthetic design. It is determined what the final case will look like finished before ever starting with dental implants. The radiographic guide is place in the mouth during the CT scan.[3,4] This allows visualization of the ideal position of the teeth on a 3-D model. The entire 3-D image is analyzed and the implant planning and simulation of implant placement completed using the computer. The surgical placement of dental implants can be done in a conventional manner using the newly created surgical guide to help direct the implants in the ideal position. However, optimally, the surgery can be completed without making any incisional flap. The implants are placed to the desired depth using the computer software and surgical guide. This software serves as an ideal aid in evaluating potential implant receptor sites. Using the CT and the interactive NobelGuide planning software allows the case to be restoratively driven and makes surgical placement predictable and simple. The virtual 3-D model created using the software provides an environment where not only quantity of bone is determined but also the quality of the bone to be invaded. Buccal and cortical thickness surrounding the trabecular bone is evaluated so that all the implants are properly positioned.[5-7] The tool allows us to also determine the position and angulation of the abutments to be used so that the final crowns are functioning down the long axis of the dental implants.

VISUALIZING A PATIENT'S ENTIRE MOUTH ANATOMY IN 3-D

Success with implant dentistry is based on the need to achieve primary stabilization and secondary integration of the titanium fixture and also maintaining hard- and soft-tissue contours to create long-term function and aesthetics. Any anatomic irregularities or limitations need to be addressed prior to implant placement. This saves the practitioner a lot of time and effort in doing the case properly from the first steps. "Measure twice, cut once" is a statement that can be readily accepted in dentistry today.

As CT scanning software is changing the way we practice implant surgery, CAD/CAM technology is also changing the restorative aspects of our practices. Improved materials and techniques are fast becoming preferential to conventional casting procedures. Precision procedures, biocompatibility, mechanical strength, and aesthetics are making the fabrication of our prosthesis constantly better and more predictable. The NobelProcera System (Nobel Biocare) is one of several systems on the market today that provide high quality conventional restorations and implant retained restorations from a variety of materials. Laboratory procedures are being

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replaced by CAD/CAM technology. The advantages of this system are precision fit, ease of fabrication, and elimination of human error. The use of compatible materials eliminates corrosion due to dissimilar metal alloys used in dentistry and improved interfaces among implants, abutments, and crowns. The NobelProcera technology incorporates noncontract scanners and conoscopic holography. A light is emitted from a laser beam and reflected in the same axis allowing for a whole range of applications. The measurement is not based on the geometry of the sensor and the system; rather conoscopic holography creates a special fringe pattern and signals proportional to the distance from the object and obtains a large amount of quality data reflected back from the surface, increasing measurement capability and precision.[1,8] The materials available for framework and crown fabrication have also improved dramatically. Aluminium oxide and zirconium oxide are high strength nonsilica based ceramics have proven to be dependable, durable, and aesthetic materials that are now used for abutments, frameworks and crown copings. The use of CAD/CAM has shown to be a time saving and cost effective process eliminating many of the problems associated with conventional laboratory casting.

MATERIALS AND TECHNIQUES CONTINUALLY EVOLVE

The Replace Implant System (Nobel Biocare) has evolved considerably since its introduction in 1997. The implants and all related surgical and prosthetic components incorporate a color coded system that allow the user to identify at a glance which restorative parts go with which size implant placed. In 1999, the Replace Tapered Implants became available with an internal connection that simplifies the impression technique, seating of abutments and crown and bridge placement. Three locking channels guide the positioning of the abutments. Once torqued into place, the abutments do not loosen, making a stable and predictable restorative result. The system can be used in a one- or 2-stage surgical procedure. Primary stability is the key factor for successful early and immediate loading.[9]

The tapered design of the Replace Select implant gives placement alternative in sites with anatomic limitations, such as labial concavities in the premaxilla. There are several collar heights available in the titanium surface treated, TiUnite, implants. The shorter collar designs are indicated for aesthetic areas and were used here. Every aspect of the implant system makes the restoration of teeth on implants as easy as conventional crown and bridge.

The internal trichanneled prosthetic connection makes placement of abutments or a prosthesis simple. These channels are 1.5 mm in depth. The diameter of the implants available in the system at the crestal interface are 3.5 mm, 4.3 mm, 5.0 mm, and 6.0 mm. The tapered design of the implant promotes elevated levels of fatigue endurance since the coronal portion is wider in diameter than the apical portion. This taper also ensures a tight fit and promotes function coronally to help offset stress shielding along the narrow, smooth crestal band on the implant. This reduces bone resorption that may result from hypo function. The taper also reduces the incidence of cortical plate bone perforation during an osteotomy preparation near anatomic undercut areas. It is important to have an implant design that allows for placement of the fixture in a way that places the forces down the long axis.

CASE REPORT

Diagnosis and Treatment Planning

Our patient was a 55-year-old male who had worn a conventional maxillary denture for many years. His desires included placement of dental implants and fabrication of fixed dentition. Obviously he did not want to leave the practice at any time without some type of prosthesis. Oral and radiographic examination revealed what appeared to be adequate amount of vertical bone and a ridge that appeared to have good width.

Prior to any final determination as to treatment it was decided that a cone beam CT scan would be done and evaluated using the NobelGuide CT scanning software. Virtual placing the implants prior to ever touching the patient would prove to be a tremendous advantage in diagnosing and preparing this case.

The patient had no significant medical complications, allergies, or sensitivities that would preclude the use of necessary implant procedures or medications. He was not a smoker nor had any significant alcohol dependency, so healing was expected to progress without complication.

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Cone Beam 3-D Imaging and the Surgical Implant Index

Tom M. Limoli Jr

Simply stated, cone beam refers to the use of cone-shaped x-rays to capture a volume of images (similar to multislice computed tomography [CT]). Cone beam imaging exposes patients to less radiation than common CT due to focused x-rays. These focused x-rays reduce the scatter that occurs with other imaging devices. In addition, the scan allows for significant reduction of metal artifacts, which allows for a scan of a patient with braces. The scan is fast and comfortable for the patient. A scan is completed in approximately 10 seconds and the patient is scanned in a normal seated position. One scan yields volumes of images that can easily be viewed and manipulated for in-depth examination.

As for using the procedure codes, D0360 is simply for securing the data capture while D0362 and D0363 are for manipulating the previously obtained data to construct and/or fabricate either a 2-dimensional (2-D) or 3-dimensional (3-D) image. In other words, D0360 and D0363 are both needed to produce the 3-D image. As concerns reimbursement for the multiple codes, most all benefit plans consider the data capture to be part of generating either the 2-D or 3-D image and will not separately reimburse for both. Who ever said that 2 codes are better than one?

As for the implant index in Dr Kosinski's case report, Figure 6 shows that the initial CT radiographic guide was created by duplicating the patient's existing maxillary complete denture. The actual surgical index guide was constructed via the NobelGuide process utilizing the recently updated NobelClinician software. Both of these components are singularly identified using one submission of code D6190. Your report and clinical documentation need to specify the construction of the 2 separate guides as well as the direct laboratory charges. Your total fee will need to address the overall number of surgical index sleeves as is being charged by the manufacturer.

Table. Cone Beam 3-D Imaging Codes and Fees

Code	Description	Low	Medium	High	National Average	National RV
D0360	Cone beam CT—craniofacial data capture	$150	$250	$400	$268	5.83
D0362	Two-dimensional image using existing data, includes multiple images	$100	$195	$328	$184	4.00
D0363	Three-dimensional image using existing data, includes multiple images	$163	$276	$307	$253	5.50
D6190	Radiographic/surgical implant index, by report	$200	$372	$721	$351	7.63

 This data represents 100% of the 90th percentile. The relative value is based upon the national average and not the individual columns of broad-based data. The abbreviated code numbers and descriptors are not intended to be a comprehensive listing. Customized fee schedule analysis for your individual office is available for a charge from Limoli and Associates/Atlanta Dental Consultants at (800) 344-2633 or limoli.com.

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Proper diagnosis for a full maxillary reconstruction is the most critical aspect of this surgical procedure. Determining the design of the final prosthetic reconstruction may indeed be the most difficult job. The patient's desire to have a fixed restoration rather than any removable appliance means that implants must be strategically placed and enough of them available to support a long-term, long span bridge. The restoring dentist needs to be dictating the final dental implant position and angulation prior to surgical intervention. Implants can be placed in an ideal position today. If there is not adequate bone augmentation, procedures have developed to a stage where predictable contours can be established. To help achieve this goal, diagnostic wax-ups, fabrication of proper fitting, functional and aesthetic dentures or now the use of computer generated implant software can be considered to idealize form and function. NobelGuide CT scanning software was used here to create a surgical guide that was used to presurgically determine the ideal location and angulation of the implant sites, and to optimize placement of the implants for maximum functional results.

Figures 1 and 2 illustrate a conventional panoramic radiograph of the patient's edentulous maxilla and facial view of the ridge. Following evaluation of the edentulous maxillary ridge a CT guide was created by duplicating the patient's existing functional conventional maxillary complete denture. Gutta-percha was strategically placed in 8 or more positions in 3 planes within the CT guide. The scanning was done using the i-CAT Cone Beam 3-D Dental Imaging System. Initial evaluation of the available bone and contours was done using the iCATVison Software (Figures 3 to 5). However, it was determined that we would take this case one step further and fabricate a proper surgical guide using the NobelGuide scanning software. This system would create a surgical template that would be locked into position and the predetermined NobelBiocare Replace Select dental implant placed with precision through the guides in the surgical stent (Figures 6 and 7). This would allow a flapless procedure that would accurately place the dental implants at a predetermined depth and angulation. The surgical aspect of the entire process then became a simple application of increasing drill size, creating the osteotomies and eventual

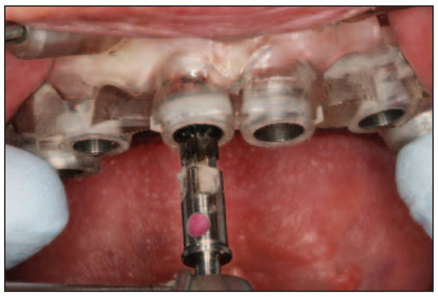

Figure 10. The NobelGuide system (Nobel Biocare) uses longer tapered drills for the Replace implant system, which allows precise osteotomy preparation using the predetermined surgical guide sleeves. Note that the acrylic guide thickness was made to accommodate the acrylic, soft tissue, and final bone depth.

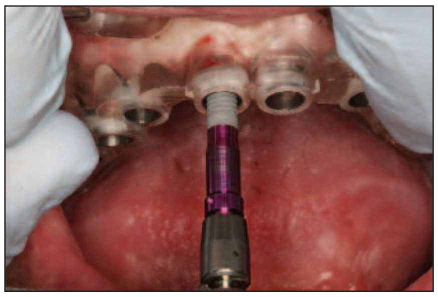

Figure 11. The dental implant was slowly torqued into position through the surgical guide sleeve at 25 Ncm to final predetermined position.

Figure 12. Once all 8 implants were placed, the surgical guide was removed, leaving the implants in place. Note that no flap was required and there was little to no bleeding at the surgical site.

Figure 13. Conventional impression techniques were made using direct impression copings immediately following surgical placement of implants.

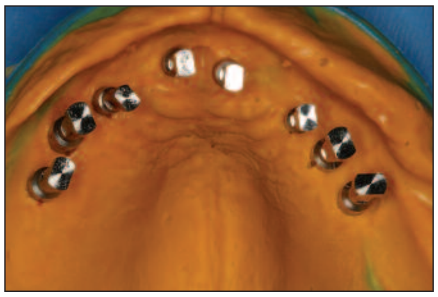

Figure 14. The impression copings were placed into the final polysiloxane impression, which was used to fabricate the master cast, CAD/CAM substructure, and individual crowns.

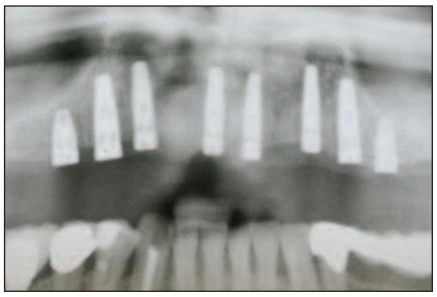

Figure 15. Final panoramic radiograph of the 8 Replace Select dental implants (Nobel Biocare) strategically placed using CT technology and a surgical guide. Note, implant width and lengths were predetermined reducing inventory concerns.

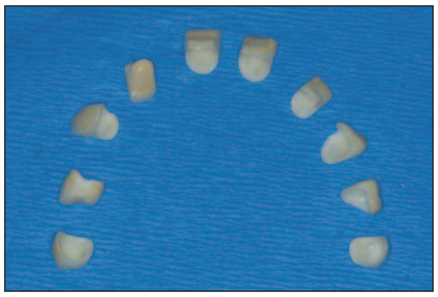

Figure 16. Ten individual Procera crowns (Nobel Biocare) were fabricated for cementation onto the substructure crown preparations.

Figure 17. The zirconia substructure was threaded into the 8 implants.

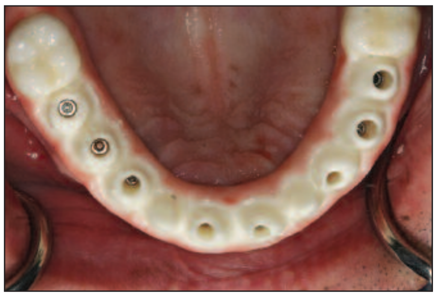

Figure 18. Occlusal view of zirconia substructure. Note 8 screws were ideally positioned down the long axis of the clinical crowns.

Figures 19 and 20. Procera crowns were individually cemented to place making any future repair as simple as a conventional crown preparation.

Figure 21. Smile-line of final prosthesis.

implant placement. This precise surgical guide is locked into position with retaining pins.

Clinical Treatment

Tapered drills of increasing widths were used to prepare the bone through the surgical guide to accept the proper size implants.

Guiding keys of various diameters are used to precisely make the primary depth determination into the bone (Figure 8). The osteotomies were created with these precision drills to the reference lines on each drill using a drill extension, which compensates for the thickness of acrylic surgical guide. A sharp tissue punch is used to excise the soft tissue from the site in a clean manner. This prevents any soft tissue from resting in the osteotomy site prior to implant placement (Figure 9). The NobelGuide system uses longer tapered drills for the Replace implant system which allows precise osteotomy preparation using the predetermined surgical guide sleeves. Note that the acrylic guide thickness is made to accommodate the acrylic, soft tissue, and final bone depth. Only with CT scanning and scanning software could such precision be accomplished without a surgical flap (Figure 10). The individual dental implants are removed from their sterile packaging and threaded into the prepared sites through the surgical guide. The dental implants are slowly torqued into position through the surgical guide sleeve at 25 Ncm to final predetermined position (Figure 11). When

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more torque was needed to complete the placement of the implant through the surgical guide sleeves into the bone, a rachet and insertion assembly was used to position the dental implant to its final depth. A marking on the hub of the insertion assembly indicates that one of the 3 trichanneled internal connections of the Replace system is placed to the facial. Once all 8 dental implants are placed, the surgical guide is removed, leaving the implants in place. Note, no flap was required and there is little or no bleeding at the surgical sites (Figure 12).

Although immediate loading of dental implants has proven to be a predictable method of providing the patient's fixed teeth following surgical intervention, it was determined in this case to simply bury the implants and reline his existing properly fitting conventional maxillary complete denture after relieving the tissue side acrylic where the implants were placed. The patient was not necessarily interested in immediate dentition; rather, this process allowed us the opportunity to idealize aesthetics. The patient left the office with his existing conventional maxillary complete denture relined with a soft liner material.

Conventional impression techniques were used with direct Nobel Biocare Replace Select impression copings. This was done immediately following surgical placement of the 8 implants (Figure 13). The impression copings were then placed into the final clean (no defects or pulls in the material) polysiloxane impression which will be used to fabricate the master cast, CAD/CAM substructure, and individual crowns (Figure 14).

Figure 15 illustrates the final panoramic radiograph of the eight Replace Select dental implants strategically placed using CT technology and a surgical guide. This was done using a flapless procedure with little discomfort and bleeding. Note that implant widths and lengths were predetermined using the NobelGuide CT scanning software, therefore any inventory concerns are eliminated (Figure 15). Amazingly, 10 individual Procera zirconia crowns were fabricated and would be cemented onto the CAD/CAM created substructure (Figure 16). The zirconia substructure with individual crown preparations is threaded and torque into the 8 implants providing long term stability and functional integrity (Figure 17). The 8 screw holes are clearly demonstrated in Figure 18, which illustrates the occlusal view of the substructure in place. The 8 screws were ideally positioned down the long axis of the clinical crowns. The surgical placement of the implants was virtually determined prior to any surgical intervention and any anatomic concerns or implant angulation issues addressed. The 8 Procera crowns are individually cemented to place making any future repair as simple as a conventional crown preparation (Figures 19 and 20).

Our patient was thrilled with the final smile design of the final prosthesis (Figure 21).

CLOSING COMMENTS

The biggest aesthetic issue in this case was the fact that the patient was edentulous and therefore had a significant amount of alveolar bone loss requiring a fairly long denture flange. Trying to replicate actual teeth would necessarily result in a very long dentition, which may not be acceptable to the patient. The decision was made to use the NobelProcera CAD/CAM process to create a substructure with gingival colored material that would be threaded into the implants and then cement on individual crowns into this substructure. Although there may not be a necessity to remove the final prosthesis, this design allows to replace individual crowns if problems such as porcelain fracture were to occur or to remove the entire prosthesis if needed. No screw holes are demonstrated in the final aesthetic result.

In this case, our goal was to try to meet the patient's expectations of a fixed maxillary bridge in a way that was simple and easy to maintain. Our patient exhibited a positive end result because of precise planning and communication among the patient, radiation technologist, dentist, and dental laboratory team.

Diagnosing and treatment planning is the most critical aspect of any complex prosthetic reconstruction. By using today's technological advances, one can evaluate a difficult case scenario and make it a procedure that any well-trained dentist can do. With the use of modern CT scanning techniques and software, one can visualize the finished case before ever starting it, fabricate precise surgical guides that allow for flapless painless surgical procedures, and employ CAD/CAM technology that creates lightweight durable structures that are extremely functional and aesthetic. Prior to the introduction of these technologies, this process was a real chore. CT and CAD/CAM provide us an opportunity to better serve our patients and provide predictable and safe end results.✦

References

1. Geiselhöringer H, Holst S. The new NobelProcera system for clinical success: The next level of CAD/CAM dentistry. *Cosmetic Dentistry*. 2009;3:26-31.
2. Iplikçio lu H, Akça K, Cehreli MC. The use of computerized tomography for diagnosis and treatment planning in implant dentistry. *J Oral Implantol*. 2002;28:29-36.
3. Amet EM, Ganz SD. Implant treatment planning using a patient acceptance prosthesis, radiographic record base, and surgical template. Part 1: Presurgical phase. *Implant Dent*. 1997;6:193-197.
4. Ganz SD. Restoratively driven implant dentistry utilizing advanced software and CBCT: realistic abutments and virtual teeth. *Dent Today*. 2008;27:122-127.
5. Kosinski T. Optimizing implant placement and aesthetics: technology to the rescue! *Dent Today*. 2009;28:72-76.
6. Kois JC. Predictable single-tooth peri-implant esthetics: five diagnostic keys. Compend Contin *Educ Dent*. 2004;25:895-900.
7. Balshi SF, Wolfinger GJ, Balshi TJ. A prospective study of immediate functional loading, following the Teeth in a Day protocol: a case series of 55 consecutive edentulous maxillas. *Clin Implant Dent Relat Res*. 2005;7:24-31.
8. Degidi M, Piattelli A. Comparative analysis study of 702 dental implants subjected to immediate functional loading and immediate nonfunctional loading to traditional healing periods with a follow-up of up to 24 months. *Int J Oral Maxillofac Implants*. 2005;20:99-107.
9. Terzio lu H, Akkaya M, Ozan O. The use of a computerized tomography-based software program with a flapless surgical technique in implant dentistry: a case report. *Int J Oral Maxillofac Implants*. 2009;24:137-142.

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Disclosure: Dr. Kosinski reports no disclosures.

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