

# Full arch CBCT-guided implant reconstruction

**Dr. Ara Nazarian treats a patient from start to finish in fewer appointments**

When a patient presents to your dental practice with questionable and/or non-restorable teeth requiring full-mouth extractions, the biggest concern is whether implants can be placed at the same surgical visit and, if so, whether patients will be able to walk out with fixed teeth. Having an implant within your practice, which allows you to load or progressively load so that these patients' demands are met, lets you position your practice to a whole new level. Of course, certain parameters must be met in order to facilitate this type of treatment. This includes, but is not limited to, the quality and quantity of bone, the presence of infection, the patient's health, and the skills of the dental provider. Additionally, the selection of the most appropriate materials for the most ideal situation must be met.

A patient presented to my practice for a consultation wanting to restore her upper dentition to proper form and function (Figures 1 and 2). She complained of generalized discomfort in these upper teeth apparently due to advanced decay as well as some periodontal disease. Although her lower dentition would require definitive treatment in the future as well, the patient wanted to focus on her upper teeth at the moment.

## Planning

The clinical evaluation included information regarding lip length and support, existing tooth position of the natural teeth, occlusion, restorative space, and phonetics. In addition, digital images of frontal, side, and occlusal views of the dentition as well as facial shots were captured with a Nikon D7200 (Photo Med).

A CBCT scan and panoramic radiograph using the CS 8100 3D (Carestream Dental) (Figure 3) were taken to accurately capture the information needed to properly treatment plan this case ensuring the most ideal outcome, especially since the patient had discussed how disappointed she was with her existing smile. Dental implants were virtually planned, using the CS 3D-imaging software, in key positions in the maxillary arch (Figure 4).



**Ara Nazarian, DDS, DICOI**, maintains a private practice in Troy, Michigan, with an emphasis on comprehensive and restorative care. He is a Diplomate in the International Congress of Oral Implantologists (ICOI). Dr. Nazarian has conducted lectures and hands-on workshops on esthetic materials, grafting, and dental implants throughout the United States, Europe, New Zealand, and Australia.

Disclosure: Dr. Nazarian is the creator of the Reflector instrument.

The treatment plan was the further developed. Diagnostic model impressions were taken using Silginat® (Kettenbach USA) polyvinyl siloxane impression material, poured up and forwarded to the dental lab. These models were then mounted on an articulator (Stratos 100, Ivoclar Vivadent) for further analysis in order to meet the patient's esthetic and functional needs.

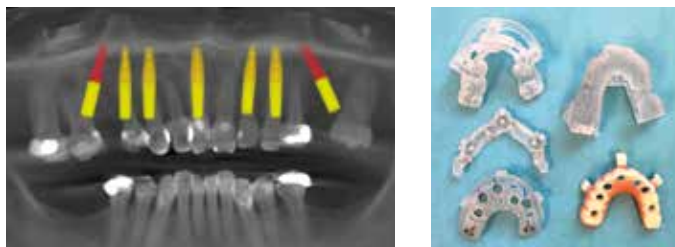
Financing options using a third-party payment option (Alphaeon Credit) were discussed with the patient. This discussion was a very important part of facilitating acceptance of her care, since it made the cost of treatment more feasible.



Figures 1 and 2: 1. Preoperative retracted frontal view. 2. Preoperative occlusal view



Figure 3: Preoperative panoramic radiograph



Figures 4 and 5: 4. Planning with the CS 8100 3D. 5. Surgical guides and provisionals (Pittman Dental Lab)

A 3D virtual treatment plan was further developed from our planning with the CS 3D imaging (Carestream Dental) software and integrating it with the photos and models. A virtual online integrative meeting with the dental lab (Pittman Dental Lab) allowed for a comprehensive review of the assembled digital and clinical information formulating an optimal treatment plan, which would fulfill the necessary requirements for esthetics, form, and function. Within a short amount of time, the dental lab had fabricated all the necessary guides for positioning, leveling, drilling, and implant placement in addition to the PMMA provisional restorations and backup dentures (Figure 5).

It is my belief that surgical guides in implant dentistry increase the predictability of treatment outcomes as well as making the clinician extremely efficient. In the past, implant placement routinely occurred by freehand technique, but this heightened the risk of damage to anatomic structures while lengthening the duration of the surgery. I personally feel surgical guides give clinicians more confidence to accurately place implants in every case whether you are a general practitioner or a specialist. Precision surgery reduces stress, decreases liability, and leads to a better outcome for the patient.

The implants that would be utilized for this case were the Touareg™-OS Dental Implants (Adin Implant Dental System). The Touareg™ S & OS Spiral Implants are tapered with a spiral tap that condenses the bone during placement for immediate stability. There are two large variable threads and a tapered design for accurate implant placement, self-drilling, improved esthetics, and better load distribution. It features a special round-shaped apex that pushes the bone graft with minimal harm to anatomic structures. In addition, Touareg-OS implants feature Adin's biocompatible and osseoconductive OsseoFix™ implant surface. This has proven to achieve the desired roughness levels for optimal osseointegration, attains the highest implant surface

purity levels and increases the success rate of bone-to-implant contact (BIC).

Once the virtual plan was orchestrated and fully confirmed, the next appointment would be the planned surgery with all the necessary components for the guided surgical approach. The patient was appropriately sedated with IV medications, and local anesthesia was administered in both arches. The tissue was then reflected using the Reflector (GoldenDent™) instrument so that the bone leveling surgical guide would be fully seated and fixed with its respectful retention screws (Figure 6 and 7). Following the positioning of the surgical guide, the maxillary teeth were atraumatically extracted utilizing the Physics Forceps® (GoldenDent). Once the appropriate bone leveling was accomplished with the surgical handpiece, the implant surgical guide (Figure 8) was positioned into the bone leveling guide and the sites for the implants was initiated with a designated pilot drill in the Adin Guided Surgery Drill Kit (Figure 9).

Using precise orientation, depth, and direction, Adin's Guided Surgical Kit provides fast, effective and predictable preparation and placement of dental implants for dental practitioners. It also features easy-to-follow layouts along with containing self-centering drills with built-in stoppers. The Adin Guide ActiveFlow™ Irrigation Technology unique design directs cooling saline through the guide, ensuring that irrigation reaches the bone and reducing the possibility for bone-heating throughout the procedure.

Utilizing the Mont Blanc surgical handpiece and Aseptico surgical motor (AEU 7000) at a speed of 800 rpm with copious amounts of sterile saline, sequential drill preparation was initiated. Once the osteotomies were complete, the drivers in the Adin Guided Kit (Figure 10) were used to place the dental implants with precise timing so that the flat portion of the internal hex was positioned ideally for the receiving multiunit abutments.



Figures 6 and 7: 6. Positioning guide. 7. Maxillary bone leveling foundation guide

Figure 8: Adin Guided Dental Implant Kit

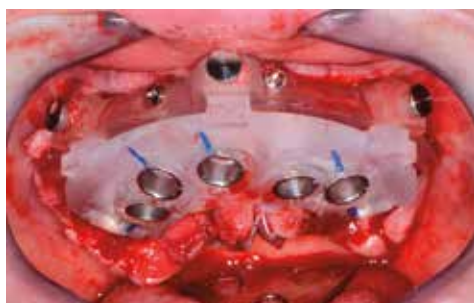


Figure 9: Maxillary implant surgical guide

Figure 10: Touareg™-OS Dental Implant (Adin Implant Dental System)

Figure 11: Maxillary temporary positioned on guide

A baseline ISQ reading was taken of these implants utilizing the Penguin (Aseptico) RFA unit. Since the initial readings were all above 72, and the quality of bone after leveling was good, multiunit abutments (Adin) were tightened into the Touareg-OS (Adin) dental implants at 30 Ncm followed by temporary cylinders at 15 Ncm.

Any residual areas around the implants or in the sockets were grafted with a cortical mineralized and demineralized bone-grafting material (GoldenDent) to optimize the area for regeneration.

The prefabricated immediate provisional arch restorations with predrilled access openings were inspected before being trying-in.

The maxillary provisional restoration was tried-in to verify a passive fit over the temporary abutments. Once confirmed, trimmed rubber dam pieces were placed to avoid the restoration (Figure 11) from locking on during the relining procedure with Rebase III Fast Set (Tokuyama) hard reline material. After the

material polymerized, the immediate provisional restoration was removed and any access material removed with the Torque Plus (Aseptico) lab handpiece and acrylic bur (Komet). Once trimmed and polished, the provisional arch restoration was seated and tightened with a torque wrench at 15 Ncm (Figure 12). The access openings were filled  $\frac{3}{4}$  of the way with Teflon® tape followed by Cavit™ (3M™) filling material.

A few days later, the patient returned for her postoperative appointment with very little discomfort, swelling, or bruising. She was very pleased with her new upper fixed provisional restorations. The occlusion was further checked and adjusted to confirm there were no interferences in lateral or protrusive movements.

Four months later, the patient presented for impressions for the definitive restoration. Using a heavy and light polyvinyl siloxane material (Panasil®, Kettenbach Dental) in a stock tray, an open tray impression was taken of the maxillary arch using transmucosal (Adin) impression posts (Figures 13 and 14). From



Figure 12: Maxillary temporary



Figure 13: Transmucosal impression posts (Adin)



Figure 14: Open tray impression (Kettenbach)



Figures 15 and 16: 15. Definitive hybrid restoration. 16. Monolithic hybrid restoration illustrating titanium frame



Figure 17: Postoperative retracted frontal view



Figure 18: Postoperative occlusal view



Figure 19: Postoperative panoramic radiograph

this impression, the dental lab fabricated a PMMA try-in of the proposed maxillary restoration for try-in and evaluation.

Once tried-in, the restoration was evaluated for midline, incisal edge, and smile line. Bite relations was accomplished using Futar® Fast Bite (Kettenbach Dental) registration material. Within a couple weeks, the definitive restoration (monolithic zirconia on a titanium frame) was completed and delivered to the dental practice (Figures 15 and 16). When the patient returned, the hybrid restoration was inserted and torqued to the manufacturer's suggested settings (Figures 17, 18, 19) and access openings sealed with Teflon® followed by composite.

The patient was instructed on how to clean and maintain her dental restoration. In addition, we reviewed the importance of scheduled professional cleanings and overall oral health habits. With this new enhanced look, the patient was motivated to care for her investment (Figure 20).

## Conclusion

Having the ability to take a patient from start to finish in fewer appointments within your practice allows you to position yourself as a provider that can fulfill your patient's surgical and restorative needs. With the proper training and appropriate materials, a dental provider may provide extraction, grafting, and implant placement within one appointment at one location. This



Figure 20: Before-and-after facial view

type of service not only allows you to reduce the amount of visits for the patient, but also helps maintain the cost to patients since they are not seeing multiple dental providers. Most importantly, this enables the dental provider full control of the surgical and prosthetic outcome. Depending on the patients' desires, the clinical conditions of the oral environment present, and the skills of the provider, a dentist may choose to extract teeth, level bone, and graft with guided dental implant placement within his/her dental practice. **IP**