A Combinational Approach to Oral Rehabilitation

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Today, we are starting to see a big increase in patients needing full mouth extractions, whether it is due to decay, periodontal disease, or infection. Also, as people mature and age, their peridontium is exposed to many more variables that may contribute to the loss of their teeth. For these patients, the biggest concerns are the availability of various treatment options within their budget, the duration of the surgical and prosthetic process and will they be able to function as they once did when they had healthy teeth. For dental providers, the most common goals are to perform the necessary treatment efficiently, effectively and predictably within their comfort zone.

In this particular case example, the patient was referred to me by her dentist. According to her previous dental provider, she had undergone quite a bit of dental work in the maxillary arch with a combination of porcelain veneers and bridgework several years prior, however, neglected to maintain regular hygiene appointments and oral home care. When she did finally present back to her dentist with a concern about the spacing and mobility in her upper and lower teeth, he referred her to me for comprehensive treatment with an all-inclusive approach using IV sedation.

When the patient presented to my practice for an initial evaluation, all the necessary diagnostic information was obtained including medical history, smile questionnaire, digital photographs and all the necessary x-rays. Upon clinical examination, it was very apparent that this patient had generalized advanced periodontal disease (Figure 1). In fact, most of her teeth had class II-III mobility with accompanying extensive cervical decay.

Upon reviewing the diagnostic information, it was understood that all the teeth in this patient's upper and lower arches needed to be removed. Because of this, the patient was very interested in getting dental implants. In order to identify if this patient was a good candidate, a CBCT was taken using the CS 8100 3D (Carestream Dental) to accurately capture the volume of bone required for optimal dental implant placement (Figure 2). Not only would we be able to assess the bone height and width, but also the ridge orientation and relationship to

Figure 1: Preoperative Retracted Frontal View

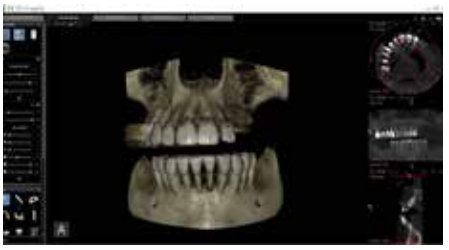

Figure 2: CBCT using CS 8100 3D

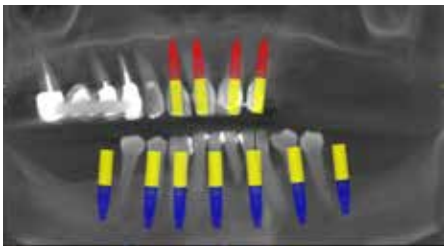

Figure 3: CS 3D Imaging of Proposed Treatment

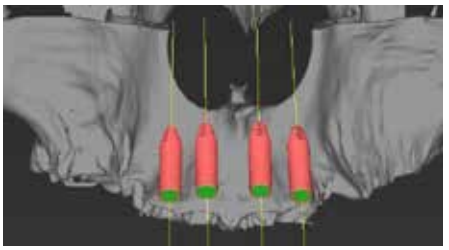

Figure 4: 3DDX Maxillary Plan of Implants

anatomical landmarks with this information. Interpreting the CBCT information, it was very clear that there was no adequate bone on either side in the posterior maxilla for dental implant placement. If the most distal implants in the premaxilla were placed at angle according to the All on Four protocols, the anterior posterior spread would still not be sufficient for a fixed restoration. The patient did not want to undergo any type of sinus augmentation or zygomatic implants due to the extent and additional recovery time of those treatments. Using the CS 3D imaging software (Figure 3), four dental implants were virtually planned in the pre-maxilla region to support a palate free metal reinforced overdenture. In the lower arch, there was sufficient bone to plan the placement of seven dental implants without compromise.

Discussion with the patient included the desired treatment plan both surgically and prosthetically identifying the pros and cons as well as information about the consequences of a surgical failure in terms of risks, time and cost.

Once the patient confirmed this treatment plan, diagnostic impressions were acquired using Silginat (Kettenbach) as well as a bite using Futar (Kettenbach). Silginat (Kettenbach) may be poured up deferred and multiple times without a concern of distortion. Digital photographs were also forwarded to the dental lab in regards to the positioning of the maxillary and mandibular incisal edge, midline, occlusion, restorative space and lip support. This way the dental lab had clear instructions for the proposed position of the teeth for the immediate dentures.

Since the dental implant placement would be implemented using surgical guides, the information on the CS 3D software (Carestream Dental) was forwarded to 3DDX (3D Diagnostix) for surgical guide fabrication. Once the position of the implants, number of retention pins and design of the guides were confirmed from both parties (dentist and 3DDX) through a secure video conferencing meeting, fabrication was initiated by 3DDX (Figures 4 and 5).

The next appointment would be for the planned surgery once the patient had obtained a medical clearance from her assessing physician. Our goal was to extract all her teeth, level the bone where needed, place the dental implants with adjunct grafting and provide provisionals to the patient in one appointment.

The patient was appropriately sedated using IV medications, and local anesthetic was administered to both arches. Starting with the maxillary teeth, atraumatic extractions were accomplished using the Physics Forceps (Goldendent) which implements a modified Class I lever movement (Figure 6). Once the teeth were extracted, a full thickness flap was reflected on both the facial and palatal aspects of the ridge using the Reflector (Goldendent), so that the surgical guide would fully seat without any interference from underlying tissue. Once positioned, sites for the three retention pins were prepared on the facial portion of the guide with the AEU 7000 (Aseptico) surgical motor and corresponding handpiece. Once the surgical guide was fully secured (Figure 7), initiation of the drilling sequence using the Guided Implant Kit (OCO Biomedical) at a speed of 800-1200rpm with copious amounts of sterile saline was begun followed by the insertion of four 3.25x12mm Engage dental implants (OCO Biomedical) at a speed of 20rpm until increased torque was necessary (Figure 8). At that point, the ratchet wrench was connected and the implants torqued to final depths reaching a torque level of about 40-50Ncm.

Using the Osseous Contouring and Shaping Bur Kit (Goldendent) any irregular areas of the ridge as well as unwanted remnant tissue was removed. Extended healing caps were placed into the dental implants (Figure 9) followed by a cortical mineralized/demineralized bone grafting material (OCO Biomedical) in areas around the implants and within the sockets. Primary closure was achieved with 4.0 chromic gut sutures (Salvin).

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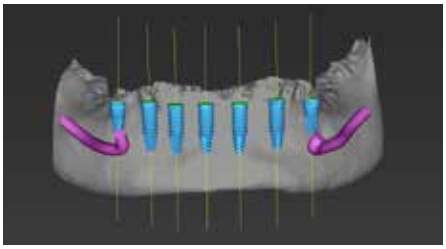

Figure 5: 3DDX Mandibular Plan of Implants

Figure 6: Extraction using Physics Forceps

Figure 7: Maxillary Surgical Guide

Figure 8: Engage dental implant

Figure 9: Implants placed for upper overdenture

Figure 10: Extraction using Physics Forceps

A Combinational Approach to Oral Rehabilitation

Continued from page 63

In the lower arch, any remaining teeth were extracted using the Physics Forceps (Goldendent) (Figure 10) followed by full thickness flap retraction using the Reflector (Goldendent). The CBCT based surgical guide was positioned and secured in the same fashion as the upper guide (Figure 11). Using the OCO Biomedical Guided Kit, the preparations for the osteotomies was performed followed by the placement of seven Engage dental implants (OCO Biomedical). Since a fixed provisional restoration was planned, an objective reading in addition to a high insertion torque was preferred. Using the Penguin (Aseptico) RFA unit, a baseline ISQ reading was taken, all averaging over 70Ncm an indication for adequate immediate loading. Since the ISQ values were favorable, slim stock abutments were tightened to 25Ncm into the Engage dental implants (OCO Biomedical) (Figure 12). The access openings were filled with Teflon tape followed by Temposil (Coltene Whaledent). The lower immediate denture that had already been relieved in the areas of the dental implants was tried in to verify a passive fit. Once confirmed, a plastic cap spacer was placed on each abutment to avoid the restoration from locking on during the relining procedure with Rebase II Fast Set (Tokuyama) hard reline material. Within 2-3 minutes, the material polymerized, so the immediate denture was removed and shaped like a fixed bridge (Figure 13) using the Torque Plus (Aseptico) lab handpiece and acrylic bur (Komet).

Four months later, the patient presented for impressions for the definitive restorations. The upper restoration would be a palate free metal reinforced overdenture whereas the lower restoration would be a sectioned bridge. The healing caps in the upper arch were removed and Locator (Zest) abutments placed and tightened to 25Ncm. Impression posts were then snapped into the overdenture attachments. Using a heavy and light polyvinyl siloxane material (Panasil, Kettenbach) in custom trays, an impression was taken of each arch. From these impressions, the dental lab fabricated a wax rim on an overdenture framework for the upper arch and a wax-up of teeth on a PFM bridge framework for the lower arch (Figure 14).

Once tried in, marks were made on the upper wax rim for midline, incisal edge and smile line. Bite relations was accomplished using Futar Fast Bite (Kettenbach) registration material. The dental lab was instructed to place denture teeth in the following wax up, so that the patient could view everything and approve for final fabrication.

Within a couple weeks, the definitive restorations were completed and delivered to the dental practice (Figure 15). The lower PFM bridge was cemented with Premier Implant Cement (Premier), taking care not to overfill the recesses. The processing inserts in the Locator (Zest) attachments of the overdenture was changed to the blue attachments which is about 1.5lbs of retention per cap.

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Figure 11: Mandibular Surgical Guide

Figure 12: Implants, Abutments, Grafting placed

Figure 13: Upper and Lower Provisionals

Figure 14: Bite Relations using Futar

The patient was instructed on how to clean and maintain her dental restorations (Figures 16, 17, and 18). In addition, we reviewed the importance of scheduled professional cleanings, the effects of continued tobacco use and overall oral health habits. With this new enhanced look, the patient was motivated to care for her investment.

Providing an all-inclusive approach to oral rehabilitation means the patient may benefit from the convenience and savings of staying with one provider from start to finish. With proper training and education, those who seek to deliver this type of treatment may assist more patients in getting on the path to more aesthetic and functional smiles.

Dr. Nazarian 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) and the director of the Ascend Dental Academy. He has conducted lectures and hands-on workshops on aesthetic materials, grafting and dental implants throughout the United States, Europe, New Zealand and Australia.

Figure 15: Dental Lab work

Figure 16: Delivery of Definitive Restorations

Figure 17: Maxillary Overdenture

Figure 18: Mandibular Fixed Bridge