

CS 3500 Intraoral Scanner

Virtual Treatment Planning Aides in Placement of Endosseous Implant

Joseph D. Mazzola, D.D.S

Case Overview

In December 2014, a 76-year-old male patient presented at my practice after his porcelain fused to gold crown on tooth #9 had broken off below the free gingival margin. Recurrent decay below the alveolar crest on the distal, along with the existence of past root canal therapy, was revealed after a visual examination. The remaining tooth preparation remained in the crown after the fracture.

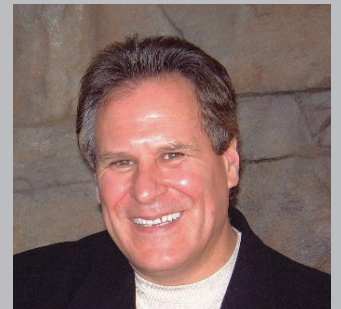


Fig. 1

A radiographic exam was performed (Fig.1). Typical treatment for such a case would have dictated crown lengthening; a custom post and core; and a new porcelain crown to address the damage. However, in addition to poor esthetics, the remaining crown root ratio would be unacceptable. It would have created a restoration with limited longevity, especially with the class III occlusion with which the patient presented.

In the meantime, decay excavation was performed and a temporary post was fitted for retention so that the crown could be cemented with a resin core build up. The patient was informed that an alternative treatment plan would be necessary.

The first alternative treatment plan involved extraction of the remaining crown and root, immediate placement of an endosseous implant and immediate temporization. As always, a secondary treatment plan was created should the initial plan not be possible due to insufficient bone; inability to remove the remaining root without buccal plate removal; or patient preference. The secondary treatment plan involved removal of the remaining crown and root with the regeneration of the remaining ridge through bone grafting along with a bonded temporary to protect the graft without loading.



Joseph D. Mazzola, D.D.S.

Dr. Mazzola graduated from Regis University in 1979 with a Bachelor of Science in Chemistry. He was admitted to the Loyola University, School of Dentistry, Maywood, Ill., in 1979. He also chose to do additional work in both periodontics and oral surgery specialties.

Following graduation in 1983, Dr. Mazzola began general practice dentistry in Broomfield, Colo. He immediately began study of temporomandibular disorders and occlusion, observing the link to periodontal disease. He completed the course work recognized by the Academy of General Dentistry and was awarded a Masters in the Academy of General Dentistry, which has been granted to less than 3,000 dentists worldwide.





Treatment Planning

The first treatment plan was accepted by the patient. To ensure we had as much data as possible to proceed with the treatment as planned, preoperative photographs were taken (Fig. 2), a CBCT scan was performed (Fig. 3) and a full mouth scan was done using Carestream Dental's CS 3500 intraoral scanner (Fig. 4). The images captured with the CS 3500 were then used to create a digital model.



Fig. 2

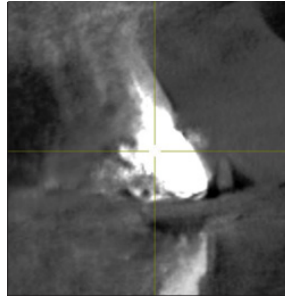


Fig. 3



Fig. 4

For this case, virtual treatment planning was used to create a precision surgical guide and printed analogue model. The CBCT scan and digital model created with the CS 3500 were sent to 360imaging via the lab's web portal.

Once the files were uploaded, 360imaging's staff of oral surgeons and laboratory technicians provided assistance in treatment planning, including determining the size of the implant, its length and its position in the alveolus. 360imaging also provided a detailed report of the treatment plan (Fig. 5-7); a drill protocol plan for the particular implant of choice; and accompanying images for record-keeping purposes.

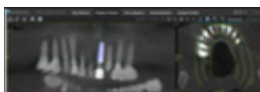


Fig. 5

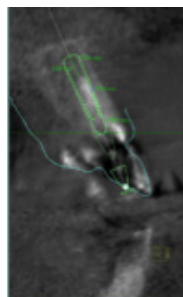


Fig. 6

Implant-1

Name	Color	Apical Diameter	Occlusal Diameter	Length
9		2.4	3.7	13

Sleeve

Name	Color	Length	Inner Diameter	Thickness	Offset
Zim 4.2 - 4.0		4	4.2	0.44	5.75

Drilling Depth

25 mm

Fig. 7

The analogue model (Figs. 8-9) was then sent to Aesthetic Oral Arts in Livingston, Mont., for fabrication of the immediate non-indexed temporary restoration (Figs. 10-11).



Fig. 8



Fig. 9

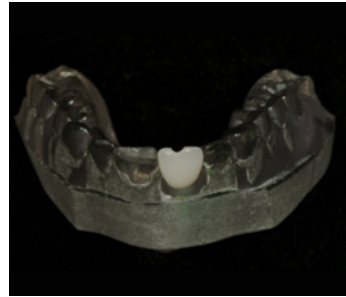


Fig. 10



Fig. 11

Treatment



Follow up radiograph



Final results

The treatment then proceeded as planned. The root was removed atraumatically. The socket was inspected for alveolar damage, prepared and the precision guide was placed and checked for an accurate fit within the arch. The osteotomy was prepared using the Zimmer precision drill kit and protocol, in conjunction with the drill instructions provided by 360imaging shipped with the precision surgical guide.

A 3.5 x 13 mm Zimmer Screw Vent implant was placed, primary stability insured and small particle Puros mineralized cortico-cancellous bone was packed between the implant and any voids around the coronal module. The temporary was then placed, the screw access filled and then bonded at the contact areas on the adjacent teeth for added stability. The occlusion was checked to make sure no contact was evident in centric and all other movements. The patient was released with post-operative instructions. The entire appointment time was 60 minutes from anesthetic to the patient release.

Conclusion

I have been placing and restoring dental implants in my practice for over 20 years, and doing immediate placement and loading of such for the last 10 years. My treatment of choice is immediate placement, especially in the anterior region. The rationale behind this is if I can atraumatically remove a root and keep the alveolus intact then placing an endosseous implant will help keep the natural anatomy intact. This depends on the health of the alveolus at the time of extraction and I do not routinely place implants into an infected alveolus. In the posterior, I routinely immediately place implants, depending on the anatomy of the alveolus and the ability to get primary stability, without impinging on the proximity of vital structures. I do not find it a necessity to immediately load immediate placed posterior implants—as most patients do not mind not having a tooth for three to four months—and I feel the risk of loss of the implant outweighs the need for a posterior tooth. Temporization can be done with alternative methods to loading but I find most patients would rather save the added costs.



Since using the precision surgical guides, I have found placement to be very precise; the speed of surgical completion amazingly fast; and the stress of freehand placement diminished. I have been able to place implants in severely resorbed mandibles with precision and at minimal risk, which saves my patients money because they can avoid costly bone grafting and receive the teeth they have always wanted. Overall, for just a minimal cost, the precision surgical guide has increased the ease and acceptance of implant placement.

Testimonial

The era of computer-aided design and computer-aided manufacturing, (CAD/CAM) is here to stay, and dental prosthetics, implant dentistry and orthodontics are moving into this digital arena. The accuracy of digital dental restorations, digital surgical guides and modeling has been well proven. They provide practitioners with better quality restorations, precision placement of endosseous implants and the ability to move teeth (with or without brackets and wires) more efficiently and with better predictability. At minimum, all dental practitioners need to embrace digital scanning technology to help them succeed in today's digital world.

The CS 3500 intraoral scanner from Carestream Dental is very small and user-friendly; it is not tethered to any CPU or cart and is not cumbersome to use. Any dental assistant can be trained to use it with great success. Not only will the dental office save on impression materials, it will save on model stone and the labor required to pour models and prepare them for laboratory shipping or pickup. Scanned models and laboratory prescriptions can be ready for sending over an internet portal to your favorite milling lab with minimal effort.

The quality and speed of patient record delivery to laboratories allows the dentist to provide treatment to patients with high accuracy, saving time for the office and the patient. If you are concerned about staying current with the latest trends in technology and available services a digital scanner is a must. The CS 3500 intraoral scanner is the best choice for any office.

Would you like to know more? Please call **800.944.6365** or visit us on the web at **www.carestreamdental.com**.

Clinical Case Study

