

Moving into Our Digital Future

Case Study - Brockton Dental Lab By Mike Carpenter

Editor's Note: Dental Imaging Labs like Brockton are a unique type of medical service provider found mostly in the Western United States and the "sun belt" states. These imaging centers provide full service x-ray, photo and tracing services for orthodontists, oral surgeons and other advanced practice dental professionals. AMS has a long relationship with this unique set of customers. This is an example of how AMS can help with the needs of specialized practices.

Background: Last fall at the AADMRT meeting, one of the guest speakers asked the audience, "How many of you now use Cone-Beam equipment?" More than 60% of the several hundred in the audience raised their hands. Not so long ago, you would have seen only a few hands raised.



Brockton Dental X-Ray Lab, Inc., a family owned and operated business, was opened in 1972. Although we are located in Riverside, California, we see a large number of patients from the surrounding communities.

Moving Forward: In 2005, we decided it was time to upgrade both our office and our technology. This led us to acquire a Cone-Beam x-ray unit and to review how we could move our processes from paper to digital. With the new Cone Beam x-ray unit we began generating hundreds of quality digital images, but more importantly, we wanted to improve our workflow so that we could get our referring dentists their new images in record time. Additionally, we wanted to do so without increasing costs and when possible, to reduce our costs.

In our business, it is all about having an efficient workflow that produces quality images in a reasonable period of time. When a patient comes into our dental lab, we generally take digital clinical photographs as well as a variety of traditional and digital x-ray images. When requested, our tracings are hand drawn by a business partner at an offsite location. Both the images and the tracings are generally available within a few days after seeing the patient.

When we began investigating how to tie our new processes together, what we found was that dental labs are "half-breeds..." neither "fish" nor "fowl." We have many similarities to medical imaging centers run by hospitals or independent radiologists. However, their imaging equipment is designed to interconnect with defined digital networks, and the equipment we use is not. Medical imaging centers have equipment that is designed to automatically send images to a central digital network. We have pieces of equipment that are designed to perform isolated tasks independent of each other. The reason is clear: most equipment used by dental imaging labs was designed to be sold to independent dentists. In most cases, a dentist requires only one or two pieces of equipment whereas dental labs traditionally have requirements for many

As we considered our move to a fully digital office, we began to understand that the key to an efficient operation would now shift from the

x-ray equipment utilized to the computer network and image archive system we selected. Our images would now come to us in at least four different formats. Cone Beam images and other digital x-rays would be available in a DICOM format. Pictures from our digital camera would become ".jpg" files. Some x-rays might still be on traditional film. Similarly, our tracings could either be on paper or saved in a variety of digital formats. Not only would our images be in several different formats, but they would generally not be available at the same time or come from the same location. We would need to store the images in one central location until all images for a particular patient were complete and then "package" them to be sent to the referring dentist. And, for the doctors requesting digital images, we felt it would be prudent to keep a copy for our security and, in some cases, for later comparison and/or duplication.

We needed a "Central Organizing System": Equally important, we felt it would be nice to convert all of these different formats into a single format to allow for their easy storage, retrieval, aggregation and transmission. But what format should we use?

"DICOM" is a standard file format designed for medical images. Whereas a ".jpg" file is only the image (with a description in the title we give the file), the DICOM file format has been designed to provide images, as well as associated information needed by a computer and the person viewing the images. The DICOM file format is basically a picture merged with text information about that picture. That information contains the patient's name, ID,

tracing sSoftware are not set up in a DICOM file format.

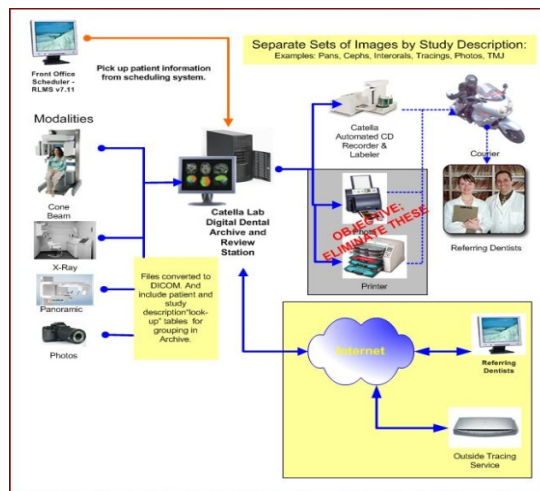
If they were, then it would make filing and managing all this digital information a snap. This left us with two other BIG issues. First, how to get the non-DICOM file formats into a common DICOM format. Second, how to organize all these images and transmit them to our referring dentists.

We consulted with American Medical Sales ("AMS") because several of their past and present staff members were well known in the dental lab community. Also important, AMS has installed many digital networks (PACS-picture archive communication systems) in the general medical imaging community, their prices seemed very reasonable and they had strong knowledge of telecommunications, which we felt was important to solve the additional issues we were faced with. Furthermore, AMS had developed a simple program that would allow us to enter patient demographic information and merge this information with standard picture files (.jpg, .bmp, .tif) to create DICOM files. Once the files are converted to DICOM, they contain patient identifying information and can be easily stored on a PACS. This is a nearly automatic process. As more images come in for a patient (perhaps hours or even days later), they are grouped with the patient's existing images. So, for example, when our offsite partner sends in a set of digital tracings for a patient, they are automatically sorted and stored by the AMS network with the other images for the same patient.

When all images have arrived, we quickly review them and with a push of one button, all of the patient's images are burned to a CD for the referring physician. Our logo is printed on the CD as well as the patient's name, ID and date the CD was created.

Since all images are now in a common electronic format, they can be stored for months, years or however long we wish. If a referring dentist loses their patient's images, all we need to do is burn another CD.

This very straightforward method of organizing images saves us tremendous time and allows us to efficiently deal with the huge volume of images created by our new Cone Beam system and the all-digital world we are now entering.



gender, age, date of birth, referring doctor and perhaps hundreds or even thousands of other pieces of information. Since the Cone Beam generates the largest number of images in our lab, and since that machine already issues DICOM files, it made sense to focus on this format. However, the pictures taken with a digital camera, scanned x-rays, or the



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