Cone Beam CT for Pre-Surgical Assessment of Implant Sites
By: Dr. David C. Hatcher

ABSTRACT: The presurgical assessment of proposed implant sites requires very specific and accurate data. Imaging has always been used to assist with the implant site assessment but until the recent introduction of cone beam CT (CBCT) scanners the available imaging had a low value when considering the ratio between diagnostic potential, cost of study and risk to the patient. We are currently enjoying the 2nd and 3rd generation CBCT scanners. The use of CBCT scanners as maxillofacial imaging modalities have proven to be an extremely useful imaging tool for pre-surgical assessment of implant sites. CBCT scanners are easy to use and produce a 3-dimensional image volume that can be reformatted using software for customized visualization of the anatomy. Protocols have been developed that optimize the visualization of image for implant site assessment.

Anatomic and prosthetic factors are considered by the clinician to determine the best implant placement sites. Implants need to be placed where they have the best chance for success. The implant not only needs to be located in an area of a missing tooth but the implant needs to be placed in a way to satisfy restorative, esthetic, biomechanical and functional requirements (prosthetic considerations). Imaging can be used to determine status of the anatomy in the proposed implant site and how to best optimize the implant placement considering the prosthetic needs and anatomic constraints. An imaging stent can be used to provide detailed feedback relating the prosthetic and anatomic considerations. Determining the relationships between the anatomic and prosthetic considerations leads to the development of a set of imaging goals and the methods required for achieving the desired imaging outcome. Ideal imaging studies are the successful fulfillment of goals derived to solve specific clinical problems. There is a wide spectrum of imaging options requiring a thoughtful strategy to select imaging techniques that produce optimum diagnostic information. The ideal imaging modality produces the desired diagnostic information while minimizing the cost and risk to the patient.

Planning Continued on page 13
The world of Maxillofacial Imaging has been changing so rapidly, that our centers will never be the same as they were just 10 years ago. We are rapidly transforming into an organization of digital dental x-ray labs. Many of our AADMRT members own and operate digital equipment; some have, in fact, for many years. Most of these centers, however, also still include chemically run, film-based images. This is what I like to call the hybrid dental imaging lab.

These digital-analog dental x-ray labs take both high-tech digital and old school images. They use chemical processors and darkrooms with duplicators, but they also have servers, scanners, CCD, and flat panel sensors. These labs produce hard copy film (both x-ray and paper) and soft copy (both CD and internet based). The result is a very nice combination packet for the doctor that contains a hybrid of information for treatment and diagnosis. Most of the doctors like it this way; they are getting the best of both worlds. Most of these referrals want to hold onto a little piece of the old world that has some familiarity to it. They know that the field of imaging is changing fast, but some labs and doctors still like to keep a piece of the analog based images, so the hybrid imaging works well for them.

This analog-digital mix helps make the transition to digital imaging a little easier for everyone. The same transition period was necessary with automobiles. When the auto industry first introduced a full electric vehicle back in the late 80’s, few wanted one or appreciated the advantages or the technology that was used to develop these cars. It may have been too much change too soon. Now gas is costing more, and with the new gas-electric hybrids, people are buying them as fast as they can be built. This combination of old and new has been easier to accept by most; it is a comfortable compromise.

Digital dental imaging is here to stay, and it is growing at an astounding rate. Technology is going to continue to morph and evolve, and like the hybrid car, we can learn to embrace technology while still holding onto the familiarity of traditional methods. Ten years ago we did not have much in the realm of digital imaging; ten years from now digital imaging may be all that we have, and this is a good thing. The hybrid-imaging center as we now know it will be a thing of the past; with some of our organization’s imaging centers, this has already taken place.
Finally, the dream of three dimensional images for diagnosis and examination has come true with 3D Accuitomo XYZ Slice View Tomograph. The 3D Accuitomo facilitates the observation of clinical cases such as implants, apical abscesses, TMJ disorders and impacted teeth, which are difficult to observe with conventional two dimensional imaging.

- 3-Dimensional Images
- Super High Resolution
- Low X-Ray Dosage
- Compact Size

To order or for more information call 866-JMORITA (566-7482).
i-CAT™ Imaging System

- Full 3D Volumetric Scan with patient scan time of 20 seconds or less
- Compact Design with the patient in a seated position
- Priced Affordably

Panorex CMT and Panorex CMT Plus

- Complex Motion Tomography for Implants, TMJ, Sinuses & more
- Panoramic Imaging
- Cephalometric Imaging

Imaging Sciences International

Serving the AADMRT for over 10 years

Manufactured in the USA

800-205-3570, 215-997-5666
www.imagingsciences.com
Sometimes we have difficult-to-work-with patients, but it doesn't have to be. At our x-ray lab we make it a challenge for our team to change the attitude of a cranky patient. Instead of thinking, “Oh no, we got a tough one”, we make an effort to soften them, and have them leaving our office feeling satisfied that the expenses incurred were justified and necessary. It does not always happen, but 90% of the time we are successful. This type of patient comes in with an attitude and they usually get it thrown right back at them. It is a cycle. We try to break that cycle. Most of the time this type of person just needs some extra TLC.

When I have a patient that is reluctant to do the procedures and says things like “I don’t know why I need these x-rays, etc.” I have a technique that works well for me. I stop and gently ask the patient if they need more time to think about if they want to have the procedures done. I let them know that I feel uncomfortable doing the work-up if they have reservations. Perhaps they have some questions they want to ask their referring doctor and need to reschedule. This must be done kindly and genuinely. I have never had a patient decide not to proceed. Then after they have made the decision that they do want the x-rays, I feel I am back in control and the patient is then very compliant. They leave our office assured that we took excellent care of them.

Camille Mayorga
Board Positions Available

It’s time again for active members to apply for a position on the Board of Directors. There are a couple positions open, and this would be the perfect opportunity to contribute your ideas to our organization!

Voting for the nominees will be held at our annual convention this October in Phoenix, Arizona with the new term beginning January 2006.

Interested members need to contact: Jeannie Herriott (541)344-1578 or nominating@aadmrt.com no later than September 1st.

Applications Specialist Position

Hitachi Medical Systems America (HMSA) has an exciting career opportunity for an Applications Specialist located in the Western region of the US. The candidate must be willing to travel extensively to perform on-site training to our customers on the use of our dental imaging system, CB MercuRay and its viewing software, CBworks. The specialist will also provide helpline support for customers and assist with sales and marketing support. The candidate must have excellent communication skills. Prior training experience is a plus. Must be a dental x-ray technician. Conebeam CT experience is a plus.

Please submit your resume and a cover letter with salary requirements to Ronda O’Connell, Clinical Science Manager at oconnellr@hitachimed.com.

Toothprints

The Connecticut State Dental Association, working with the Masonic Fraternity—the Freemasons—developed a comprehensive child identification program to help identify and return children who are abducted. This identification program is free of charge.

The materials consists of a video tape of the child, shot from several different angles, which includes the child’s voice and speech patterns; a set of fingerprints; a digital still photo which can be used for “Amber Alerts, posters; and Toothprints, a bite impression technique developed by Dr. David Tesini which has proven very helpful in child identification. Dental Professionals will be needed to make the impressions. Arrangements are being worked out with both the ODA and the State Department of Education.

Cover Article Gets Reprint

The cover article written by Dr. Scott Ganz in our spring issue of Currents has been noticed by SimPlant Academy, and they have requested a link from the AADMRT web site to their web site regarding this article. Please go to www.simplantacademy.org to see the link.
2005 Fall Conference

The fall meeting will be the best ever! We have seven dynamic speakers enrolled who will entertain, enlighten and educate us in the realm of digital imaging and other topics of current interest.

The meeting is October 27–29, 2005 and is being held at the beautiful Embassy Suites in Phoenix, Arizona in the heart of the elegant Biltmore shopping and business center. Mark your calendars now!!

Every room is a suite. The lush and green indoor atrium with its’ split level styling, koi pond and piano bar is a great place to unwind after a day of lectures. There are nine restaurants within walking distance and one in the hotel. The hotel offers a complimentary, cooked-to-order breakfast and evening beverage reception.

On Friday evening you have the opportunity to be entertained with Murder at Beside Manner, a very popular Scottsdale Dinner theatre. Get your registration in early for this fun event! The manager is saving some tickets for us and it will be first come, first served. $45.00 includes dinner, the show and the tip. Drinks are extra. The theatre is a short ten-minute cab ride from the Embassy Suites. The facility is not large. Since the action is going on all around you, everyone will have a front row seat.

Arizona in late October is nothing short of spectacular! Seventy-five degrees with abundant sunshine and clear blue skies, great sunsets and lovely desert views! This is one meeting you do not want to miss! Log onto our web site for more details.

Spring Cover Gets Re-Published

The spring issue of Currents was recognized by Burkhart Dental, and requested permission to be re-published in their 3rd quarter publication. The article written by Dr.’s Allan and Taeko Farman was on Digital Intra-oral Radiography.

The AADMRT will get recognition and reference to their article by giving the AADMRT web link and re-print copy write. To view the Brurkhart web site go to www.Burkhartdental.com The issue of their newsletter publication focuses on educating doctors about technology, equipment, and helping them succeed in business.

Future Radiology Meetings


BAOR- The Brazilian Association of Oral Radiology will be in Porto de Galinhas-Pernambuco, Brazil, and beginning on October 20th, 2005. For more information log onto: www.ndata.com.br

AADMRT- The 27th annual conference will be held in Phoenix Arizona at the Embassy Suites hotel from October 27-29, 2005. For details log on to www.AADMRT.com

AAOMR- The American Association of Oral Maxillofacial Radiology will have its annual session in Charleston, South Carolina from November 16 – 20. For more details, log on to www.AAOMR.org
SimPlant Master
provides state-of-the-art dental CT imaging services to referring oral surgeons, periodontists, prosthodontists and general dentists.

- Images from a wide range of CT and Conebeam CT scanners are accepted
- DICOM compliant

Materialise Clinical Services Inc.
810-X Cromwell Park Drive • Glen Burnie, MD 21061 • United States
phone: +1 443 557 0121 • fax: +1 443 557 0036 • e-mail: Info@simplant.com

www.simplant.com
Health Effects of Radiation

The National Academy of Sciences (NAS) just released a report on the health effects of very low doses of radiation. This report was developed after an investigation of the theory that there is a threshold dose of radiation below which cancer is not induced. According to the chair of the committee that developed the report, the health risk posed by radiation from x-rays and other health procedures is so small that it should not deter people from seeking needed medical care. However, the report supports previously reported risk estimates and states, “It is unlikely that there is a threshold below which cancer (is) not induced.”

The committee estimated that 1 out of 100 people would likely develop solid cancer or leukemia from an exposure to 100 millisievert of radiation over a lifetime, with half of those cases being fatal. The report states that in the United States people are exposed to background radiation at an average dose of 3 millisieverts annually, and according to the Centers for Disease Control and Prevention, the radiation dose from a dental x-ray ranges from 0.04 to 0.15 millisievert. Media interest is anticipated, given the topic’s broad appeal.

The ADA standby response to the NAS report is on ADA.org and highlights the Association’s long-standing recommendations that encourage dentists to:

- Follow the ALARA (As Low As Reasonably Achievable) principle and order x-rays only when necessary for diagnosis; and
- Appropriately use protective thyroid collars and aprons on all patients during x-rays.
Dolphin’s cephalometric analysis program is used by more professionals and advanced academicians than any other product in its category. This software is designed for the most demanding scientific research, board exam submission, as well as everyday case documentation. You can easily digitize x-rays, customize analyses and accurately superimpose tracings from different treatment stages. This program can also be integrated with virtually any pan/ceph digital x-ray system or used with scanned radiographic film. With the best technical support in the profession, it’s easy to see why Dolphin’s cephalometric analysis program is the software of choice.

To learn more, visit www.dolphinimaging.com or call 800-548-7241.
By: Nan Chase

Like many people who own businesses, Nan K. Chase used to find it hard to take a break. Instead, Chase, who works as a freelance writer and public relations consultant, found that life with her husband, Saul, and their children was suffering from the constant pressures of work. “The problem wasn’t that we hated our work but that we loved our work and couldn’t stop,” explains Chase, who lives and works in Boone, N.C.

She found the solution to her very modern quandary in some ancient wisdom: she decided to start observing the Sabbath as a day of rest. While her solution came from her Jewish roots, she feels that you don’t have to be Jewish—or religious at all—to benefit from the discipline of having one day a week without work. Instead, Chase believes that setting aside a day of rest is a powerful management tool for business managers and staff. Here’s how she describes her experience:

I found the answer to our family’s problem in a book about Jewish holidays. The Sabbath, the book explained, stands apart from any kind of work, “an enchanted island of time” given over to celebration of life’s sweetness. Thus, on the Sabbath we couldn’t engage in our regular work or talk about it, or do yard work or housework. Once I decided to abide by this holiday, I was amazed to reap quick dividends: an energized relationship with my husband, time to enjoy our teenage children’s last years at home, and a clearer view of my long-term business strategies.

The key was treating each Sabbath like a vacation. If I were going on vacation, I wouldn’t think of leaving town without first clearing my desk so I could enjoy the holiday. If I wanted to limit the workweek, I had to evaluate my output through that lens. Then it was easy to streamline my operation, concentrating on the accounts paying best by the hour and on those that paid fastest and most reliably. My sales efforts reflected that sharper focus: ironically, once I started taking a vacation every week, my income doubled within a year.

When Saul and I began our first nonwork Sabbath, it was painfully clear that we had little to talk about except work—a forbidden topic. We have since fashioned a new life together on our day of rest.
Why Choose the **NewTom 3G**?

**The "3G" Stands for Third Generation** - With over 260 NewTom 9000s installed worldwide, we were the first to bring conebeam, volumetric technology to maxillofacial imaging.

**Very Low Exposure** - With up to 20 times less radiation than other conebeam systems, the NewTom 3G delivers just 5.4 actual seconds of low-dose exposure.

**Multiple Fields of View** - The 3G provides volume sizes of 8.5", 6.5" and 4.1" with increasing resolution. The 12 bit 3G supports 4,096 levels of gray with voxel sizes between .4mm - .2mm.

**Child Safety** - With the 3G’s unique “Safe Beam” technology, the radiation level is set automatically according to anatomical density. A small child will receive up to 40% less radiation than the already very low level for a full-sized adult.

---

**Unlimited Imaging** - From a single, low-dose 3G scan, a virtually unlimited number of high-quality images can be created: cephalometrics, panoramics, cross-sectionals, and 3D views are only a few mouse clicks away.

**Easy to Place** - The 3G weighs just 800 lbs, uses standard power, and can be placed in a room as small as 7.5' by 9'.

**Full-Featured Software** - The sophisticated NewTom 3G software has been designed to deliver high quality images that can be placed in user-defined templates and delivered on photo paper, film or digitally. DICOM output is supported.

**The NewTom is all we do!** - Supporting our NewTom clients is our only job. We have worked hard to earn our reputation for outstanding customer service.

---

Suite 102 - 950 S. Tamiami Trail
Sarasota, FL 34236
941.955.2885 941.955.2884
www.aperioservices.com
The purpose of this article is to introduce volumetric imaging (cone beam CT) for pre-surgical assessment of implant placement and to compare this technique with other available imaging techniques.

**IMAGING GOALS:**

**GENERAL IMAGING GOALS:** Once the implant sites have been determined then the imaging strategies and goals can be developed. In all cases the replacement of the missing teeth involves restoring a portion or all of the occlusion and therefore there may be anatomic interests that extend beyond the implant site. This may be an important consideration when determining the imaging strategy. For example, do you want the region of interest extended beyond the implant site to include all components of the articulation, such as the opposing arch, maxillomandibular spatial relationships and temporomandibular joints (TMJs). Imaging can be used by the clinician to understand the anatomic foundation for placing the implant and restoring the occlusion.

**Image the entire region of interest (ROI)**

**View the ROI in at least 2 planes at right angles to each other (3D perspective)**

**Obtain images with maximum detail, minimal distortion and minimal superimposition** The diagnostic value of the imaging study must in balance with the cost and risk associated with obtaining the study.

**IMPLANT SITE ASSESSMENT**

**IMAGING GOALS:** For each implant site the following anatomic considerations may allow the clinician to determine the best site for the implant and meet the prosthetic goals

- Determine bone height and width (bone dimensions).
- Determine bone quality
- Determine long axis of alveolar bone
- Identify and localize internal anatomy
- Determine jaw boundaries
- Pathology detection
- Transfer of radiographic information

**Bone Dimensions.** Bone height and width allow the clinician to determine how much bone is available in the proposed implant site.

**Bone Quality:** Dynamic loading of an implant imparts forces to the adjacent bone. There is an assumption that bone density is directly proportional to load bearing capacity of the bone and that implant failure is associated with low bone density. The architecture of the supporting bone is also a factor associated with the functional capacity of these tissues. Dynamic loads received by the implants may strain the supporting bone and induce changes in that bone. Bone requires a certain amount of strain for maintenance, but excessive strain may cause fatigue failure of the trabeculae.

**Long axis of the alveolar bone:** Axis orientation describes the angle formed by the vertical long axis of the alveolar-basal bone complex when viewed in cross-section. Information about the axis orientation is important for successful alignment of the implant within the boundaries of the jaws. Determining the long axis of the alveolar bone allows the clinician to optimize the trajectory of implant placement with the emergence profile and loading characteristics of the implant (figures 1,3,4).

**Jaw Boundaries:** Imaging can be used to identify the outer boundary of the jaws including impressions into the jaws, such as, fossae (Figure 1,3,4)

*Imaging continued on page 15*
Introducing the CB MercuRay™ Maxillofacial Imaging System from Hitachi.

Leave it to Hitachi, a world leader in innovative diagnostic imaging, to set the new standard for maxillofacial visualization. One system that delivers true quantitative data and high quality images from any view desired. For 2D including panoramic, serial and anatomical views from every projection. For 3D volume reconstruction. For oral surgery, orthodontics, implant planning, plastic and reconstructive surgery and more.

For the first time, a single system does all this, with unprecedented image quality, speed and significantly less radiation than ordinary CT scans.

Backed by Hitachi’s legendary applications, service support and customer marketing tools, the CB MercuRay system offers:

- Distortion-free panoramic views
- TMJ linear tomograph series
- Cephalometric views including soft tissue
- Isotropic CT volume slicing
- 3D interactive volume rendering
- Paranasal sinus and airway visualization
- and much more

The system is remarkably fast – 10 seconds – and very patient-friendly. The CB MercuRay represents the new standard of care in dental imaging. Best of all, it’s from Hitachi, so you can count on our complete range of site planning, installation expertise, applications training, service and marketing support for years to come.

The CB MercuRay system from Hitachi. Now, See What’s Possible from the neck up.

See What’s Possible.
Pathology detection: Jaw pathology in the proposed implant site or within the maxillofacial regions is important to detect, diagnose, treatment plan and treatment sequence. Abnormalities involving the alveolar ridge include retained root tips, inflammatory processes, cyst and tumors. In addition, anomalies involving other maxillofacial structures, such as, maxillary sinuses and temporomandibular joints (TMJs) may complicate the successful implant process. For example, changes in stress (force/area) directed at poorly adapted TMJs may increase TMJ symptoms. Changes in TMJ stress levels may result from operative manipulations, changes in masticatory abilities and changes in vertical dimension or maxillomandibular spatial relationships (Figure 5, 7).

Transfer of Radiographic information (communication): The diagnostic and treatment planning information gained during image analysis may need to be transferred. For example, the restorative dentist may perform the original image analysis and has made decisions about the precise placement location for implants and now wants to convey the information to a surgeon and/or patient. Images and derivative information can be used for downstream communication and knowledge transfer (Figure 6).

Figure 3: These images are for a 25 year old male with congenitally missing mandibular bicuspid teeth. The sites are being evaluated for feasibility of implant placement. The clinical photographs show the edentulous sites and suggest the presence of adequate vertical and buccolingual alveolar bone volume to place implants. The CBCT scan reconstructed in 3D, axially and transaxially showed a large lingual concavity that would severely limit implant placement.

Figure 4 These images are for a 17 year old female with congenitally missing maxillary lateral incisor teeth. The sites are being evaluated for feasibility of implant placement with the aid of a radiographic stent. The clinical photographs show the edentulous sites and the CBCT scans show metallic stent markers. The stent markers have been placed simulate the proposed drill path that was determined by clinical exam. The CBCT images can be used to determine if proposed drill path (implant trajectory) will conform to the jaw boundaries.

Figure 5: This sequence of images was prepared for a 64 year old male in the planning phase for mandibular posterior implants. A single CBCT scan created the opportunity to evaluate the proposed implant sites and the remainder of the maxillofacial region. In this case the following relevant information was acquired from the CBCT: left side maxillary sinusitis with an occluded ostomeatal complex, benign tumor (osteoma) extending from the buccal surface of the left side of the mandible, degenerative joint disease involving the left TMJ, over-eruption of the maxillary posterior teeth and the maxillomandibular spatial relationships.

Figure 6: A 56 year old male missing teeth #8 and 9 had a CBCT scan with a radiographic stent in place. Opaque teeth were fabricated and positioned to simulate their desired final size and position. A hole drilled down the long axis of the teeth identifies the trajectory of the implant placement and to serve as surgical guides. The stent can be used as a reference for radiographic planning and to transfer the simulation product to the mouth.

Imaging Continued on page 18
The Advanced Dental Board (ADB) provides radiographic reporting and interpretive reporting for dental imaging centers, dental practices and universities. The need for interpretive services in dentistry has been heightened particularly in view of the recent growth of cone-beam CT (CBCT) devices in dentistry. The Advanced Dental Board is comprised of dental radiologists, orthodontists, endodontists, oral pathologists and other dental specialists. The ADB service provides for interpretation of traditional radiographic images or CBCT data along with clinical recommendations for the dentist.

The development of Cone-beam Computed Tomography (CBCT) has launched an entirely new dimension to dental image interpretation. Up to now, the dentist’s primary purpose for imaging focused on a dental-related region of interest (ROI). Limitations associated with 2D imaging methods also limited the scope of interpretive expertise. With CBCT the production of 3D volumes for dental imaging has forever changed the role of the dentists as the sole interpreter of their patient’s images. Numerous images are produced that are outside initial focus of the imaging or dental ROI. These images are also part of the examination and the information they contain may ultimately affect the patient’s health and well-being. Thus, interpretation can no longer be confined to the dental region of interest (ROI).

The Advanced Dental Board (ADB) was formed to deal with this new development in dental imaging. Practicing dentists have neither time nor sufficient training to view numerous images outside the dental ROI and render an interpretation supported by their credentials. A prime goal of ADB is to have all CBCT volumes reviewed by an oral radiologist and is organized to do so in a cost effective and efficient manner. All members have considerable experience and expertise in digital imaging and all methods of cone-beam technology. Beyond interpretation, the ADB is an entity that CBCT users can turn to for advice, consultation in all disciplines of dentistry, promotional seminars and other forms of support that will best help them promote CBCT to their referring dentists and patients.

The Advanced Dental Board provides:

<table>
<thead>
<tr>
<th>Basic Oral Radiologist Consultative Report</th>
<th>Analytical Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Review of entire CBCT volume</td>
<td>• Includes the Basic Oral Radiologist Consultative Report plus</td>
</tr>
<tr>
<td>• Maxillo-mandibular structures</td>
<td>• Specific region of interest (ROI) findings</td>
</tr>
<tr>
<td>• Surrounding osseous structures</td>
<td>• Selected perspectives to best visualize ROI</td>
</tr>
<tr>
<td>• Paranasal Sinuses</td>
<td>• 3D models for visualization</td>
</tr>
<tr>
<td>• Airways</td>
<td>• Analysis of ROI</td>
</tr>
<tr>
<td>• Temporomandibular joints</td>
<td>• Recommendations</td>
</tr>
<tr>
<td>• Occult pathology</td>
<td>• If indicated, expert consultation in addition to Oral Radiology (Endodontics, Orthodontics, Pathology, Periodontology, Oral Surgery, TMJ and others)</td>
</tr>
<tr>
<td></td>
<td>• Clinical suggestions from experts</td>
</tr>
</tbody>
</table>

For more information contact: info@advanceddentalboard.com

Advanced Dental Board
1945 Village Center Dr. Suite 150, Las Vegas, NV 89134
Tel 702-212-8188 Fax: 800-635-4282 Email: info@advanceddentalboard.com www.advanceddentalboard.com
FUJI S2 PRO
- 6.17 million effective pixels
- Super CCD sensor
- High ISO values (100-1600)
- Cross-ranged 5 area auto focus system
- 3D matrix metering system
- JPEG and RAW recording formats
- Nikon F mount

$1,499.99

FUJI S3 PRO
- APS size 12 megapixel (S-pixel: 6.45 million, R-pixel: 6.45 million) Super CCD SR sensor
- Professional Digital SLR with durable polycarbonate body with Nikon F-mount
- Dual horizontal & vertical shutter release
- xD Picture Card and CF II Compatible

NEW!

$2499.00

Canon
- Second Generation 8.2 Megapixel CMOS Sensor with DIGIC II Image Processor
- Professional Level High-speed Continuous Shooting
- 9-Point High-precision Auto Focus
- Enhanced Color and White Balance Settings
- Compatible EF/EF-S Lenses

EOS 20D

$1,499.00

Kodak
- Professional-quality photographs—every print
- Fast and easy—prints an 8x10 in 90 seconds
- Print multiple photos per sheet
- Affordable—price per print never varies regardless of image content

NEW!

1400 Printer

$549.00

1400 PRINTER MEDIA
- 1666031 50 Print Media Kit (Glossy) $80
- 8957185 50 Print Media Kit (Matte) $80

P440 Printer
- Dye-sublimation print process for realistic continuous tone photographs
- Print true 8x10 photographs in 75 seconds
- 1.8" LCD on the printer so images can be viewed before printing
- Print without a computer

$399

100 PRINT MEDIA KIT $149.99
Kit includes: 2 ribbons (choice of glossy or matte) and 1 100sh pack of paper

SONY
Sony UPD 70 Media (8.5" x 11")
UPC741 1 box (72 prints) $109.99

Sony UPD 8800 Media (8.5" x 11")
UPC8841A 1 Box (70 prints) $130.00
UPC8841A (2 boxes) $125.00ea

8500 PRINTER SUPPLIES
100 PRINT MEDIA KIT $159.99
Kit includes: 1 ribbon (choice of glossy or matte) and 1 100sh pack of paper

*Prices and promotions subject to change without notice
**IMAGING OPTIONS:**

Several imaging modalities have been used for the pre-surgical evaluation of implant sites. Table 1 is a comparison matrix showing the relative value of the commonly available 2 and 3 dimensional imaging modalities. The panoramic, periapical and cephalometric images contain superimpositions, have large information voids related to depth and are affected by projection geometry so that measurements are not reliable. Only tomography, conventional CT scans and cone beam CT scans provide the information desired about each implant site. When the imaging goals are extended to occlusion, maxillomandibular spatial relationships and the temporomandibular joint then cone beam CT scans stands alone as the best value.

**VOLUMETRIC IMAGING:**

Volumetric imaging (VI) or cone beam CT (CBCT) creates the opportunity to extend the information yield beyond the conventional imaging methods and is an ideal modality for implant planning. CBCT produces accurate 3 dimensional image data. The field of view is scalable and one scan can include the entire maxillofacial region including the maxilla, mandible, base of skull and TMJs. Currently there are four CBCT units available in United States. The units have a voxel size that range from 0.1 to 0.4 mm³ and with a 12 bit dynamic range (4096 shades of gray). The small voxel size would allow feature detection size and dimensional accuracy in the range of 0.2-0.8 mm. A single cone beam CT scan contains enough information to satisfy the imaging objectives stated above including maxillomandibular spatial relationships.

Software is used to display and visualize the anatomy in a way that is clinically meaningful. The software allows for multiplanar reformation and display. The primary reconstruction of the raw data is completed parallel to the occlusal plane and therefore the occlusal plane is used as the visualization reference plane. The reconstructions can occur in the axial, coronal, sagittal, curved and oblique planes (Figures 1,2,4). The location, dimensions and thickness of the reconstructions can be varied to achieve the desired results (Figure 2). The manufacturers of CBCT scanners offer software that is capable of multiplanar reformations but third party software is also available to import and manipulate image data that has been exported in a DICOM format. Third party software includes Materialise Simplant, I Dent, and Nemotec Dental Systems.

![Figures 7: This series of images belong to a 19 year female that traumatically lost teeth #s 7-10. A typical implant work up would be isolated to the implant site (axial, transaxial, panoramic views) and allow for determination of the bone height, width and quality. With CBCT there is more information available, including the opposing occlusion and the TMJs. Evaluation of the TMJs showed left side degenerative joint disease and a right side sub-condylar fracture dislocation.](image)
SUMMARY:
CBCT, a maxillofacial imaging modality, creates the opportunity to provide the clinician with valuable information that improves the entire process of replacing missing teeth with implants. CBCT provides high quality of diagnostic images that have an absorbed dose that is comparable to other dental surveys and less than a conventional CT. The large field of view and 3 dimensional image set offered by CBCT allows the clinician to adequately assess the implant site, look at the opposing occlusion, TMJs and other factors that may associated with the total success of implant based rehabilitation of the patient’s occlusion (Figures 5,7). Software and technology development trends suggest that in the near future CBCT scans will be used to develop a patient specific 3D model that will be used for implant diagnosis, treatment planning, treatment simulation, implant placement (surgery) and tooth replacement (restoration of implant).

References:

Correspondence:
David C. Hatcher, DDS, MSc, MRCD (c)
Diagnostic Digital Imaging
1 Scripps Drive, Suite 101
Sacramento, CA 95825
The new AADMRT X-ray School has gotten off to a roaring start in 2005! We have enrolled more than 10 new students, and have graduated 4 students. We anticipate having as many as 20 students by the end of the year. The school has turned out to be a real benefit to the students from Northern and Central California. Previously, those students had to travel to Southern California for classes but now they can study in their local x-ray lab.

Because of the increase in the number of students and the time required to process them, we are looking into the possibility of hiring a paid administrator. Up to now, all our work has been done by volunteers. Bringing in paid staff would take some of the load off these volunteers and make it easier to rotate volunteers as the board changes each year.

We welcome your input on our school and are always interesting in working with new volunteers as well. Please direct any questions or comment on the school to Matt Kroona, (714) 964-6440, school@aadmr.com
Five Reasons Why

Dental Imaging Centers
Should Select Catella-LAB to Coordinate and Implement Their Digital Networks.

1. We Understand Your Business. The challenge you face going digital is different from the one faced by a dental office. Whereas the dental office needs an electronic medical records, billing and scheduling system, you need to organize and integrate a variety of different imaging and data sources and produce a neat, usable package for your referring dentists.

That's what we do every day. We have an advanced, easy-to-use, digital imaging system. We are experts in telecommunications, networking and x-ray equipment. And we can coordinate the capture of tracings, digital photographs and scheduling and billing software to enhance and improve your workflow.

2. Quality from a Proven Source. Catella-LAB is made by American Medical Sales, a company with a 50-year record of delivering products of exceptional quality to the medical imaging field. (In the dental field, our sister company, American Dental has sold and serviced the famous Quint Sectograph, the gold-standard in linear tomography, for years.) Every component of Catella-LAB reflects our dedication to the highest imaging standards.

3. More Flexibility. Catella-LAB is designed as an open architecture system and is fully modular. As a result, your Imaging Center can begin with a basic system and add enhancements as needed.

4. More Features. Catella-LAB is filled with features that make it easy and quick for the dental lab professional to examine images and provide faster response to referring dentists. Catella-LAB captures a wide array of digital files, converts them to the medical DICOM standard, and can deliver the “package” via web, CD or print.

5. The Right Price. The price is just $39,950, plus installation and training. That includes all hardware and software, pre-planning meetings and interfacing with your modality providers. If you don’t have CR or DR, we can provide these.

Why such a low price? Because AMS’s wide customer base supports development of these types of products and because we write and own our software. Most other firms are “system integrators” who piece together products developed by others. That drives up prices and delays their ability to address customer service issues.

We’re Ready to Help!

Going digital is now an easy decision to implement with Catella-LAB. It is designed to be just another piece of equipment in your practice, like your phone equipment, copy machine or x-ray machine. Catella-LAB is another AMS PACS offering to make your practice more efficient.
Intraoral Photographic Mirrors

These high quality chrome-mium mirrors offer the highest resolution for your intraoral photos. Offered in both child and adult sizes at competitive prices. They can be sterilize at 180º C. [www.maselortho.com](http://www.maselortho.com)

Processor

The Colex NDT Industrial X-Ray processor features superior film processing quality, and consistency with minimum maintenance and service requirements. Self Cleaning Crossovers; eliminate contamination by reducing the carry over of developer into the fixer. Submerged Racks; eliminate the build up of hardened crystallized chemicals on exposed rollers. [www.colex.com](http://www.colex.com)

Reference Book

Strategies in Dental Diagnosis and Treatment Planning
304 pages · 607 Illustrations (403 in Color) · $49.95 written by: Robert B. Morris DDS: Basic Premises, The Patient Interview, Radiographs, Other Diagnostic Considerations, Diagnosis, Orthodontic Interventions [www.quintpub.com](http://www.quintpub.com)

X-Ray Sign

Easy-to-use pressure-sensitive labels, just peel off the protective paper backing and the label adheres to most surfaces. Paper backing ensures unlimited shelf-life prior to use. **Dimensions**  5 x 6 (13 x 15 cm) [www.cardinal.com/RMS/](http://www.cardinal.com/RMS/)

Processor Cleaner

This cleaner is safe for all processors, roller and transports. Removes silver and developer-fixer oxidation. It is a easy one step use, 100% biodegradable and non toxic. Cleans stained countertops and vinyl floors too. [www.sdssouthland.com/web-sdssouthland/index.htm](http://www.sdssouthland.com/web-sdssouthland/index.htm)

Towelette

Stop using those square cotton sponges saturated with disinfectants. Use the modern method, Versi-Wipes. Just add the solution of your choice to this dry wipe and create your own moist towelette, custom made for your needs. [www.palmerohealth.com](http://www.palmerohealth.com)
PLANMECA DIGITAL X-RAYS

PROMAX

NEW Color TFT (Thin Film Transistor) GUI
NEW Built-in Ethernet for direct network connectivity
NEW TWAIN Interface for software compatibility without bridges or integrations
• SCARA (Selectively Compliant Articulated Robot Arm) technology
• Excellent image quality
• Optimized imaging geometry and constant magnification
• Advanced program package
• Full-view patient positioning with 3 laser positioning lights
• Real-time CCD image acquisition
• Ceph available with 1 transportable or 2 fixed sensors
• DICOM compliant
• Also available as film-based

Future 3D Imaging Upgradability
Visit our website at www.planmeca.com for information on this exciting future product

PROLINE XC

• Excellent Image Quality
• DIMAX3 3rd generation sensors
• Open patient positioning with three laser positioning lights
• Full color TFT (Thin Film Transistor) GUI with easy-to-follow color-coded menu options
• Ethernet interface for direct network connectivity
• TWAIN drivers for use with any imaging software that utilizes TWAIN protocol
• ACVC (Automatic Cervical Vertebrae Compensation) eliminates shadows caused by the Cervical Vertebrae
• Adjustable shape and size of focal trough
• Upgradable to digital Cephalometric with 1 transportable or 2 fixed sensors
• DICOM compliant
• Also available as film-based

PLANMECA

100 N. Gary Avenue, Suite A • Roselle, Illinois 60172 • Telephone: (630) 529-2300 • www.planmeca.com
Newsletter Deadlines

Winter Issue: December 1
Spring Issue: March 1
Summer Issue: June 1
Fall Issue: September 1

For Advertising Information:
Advertising@aadmrt.com
For Article Submission Info:
Editor@aadmrt.com

Or Visit our Website:
www.aadmrt.com

Future AADMRT Event Calendar

2005 Fall Conference
Phoenix, AZ
October 27-30

2006 Spring Seminar
Orange County, CA
April 28

2006 Fall Conference
Monterey, California
September 28-30

2007 Spring Seminar
Northern California
TBA

We Appreciate our Advertisers:

Foto Club
Aperio Services
Pacific Dental Mounts
ceph-X, Inc.
Planmeca
Panoramic Dental
Imaging Sciences International
Design Technology
P&G Products
Dolphin Imaging
American Medical Sales
Hitachi Medical Systems
Advanced Dental Board
J. Morita USA
Materialise Clinical Services Inc.

www.aadmrt.com

X-Ray Lab & Imaging Currents

AADMRT
1 Scripps Drive #101
Sacramento, CA 95825