Understanding a Complete EDR and Digital X-rays Solution

Erin Norris, Special Markets Manager of Clinical Affairs
DEXIS – Gendex – KaVo – Pelton & Crane

Marc Capots, Special Markets National Technology Manager

Today’s Agenda
• What is Digital Radiography
• Integration or Bridging with Practice Management
• What Components are required
• What Types are there
• Which is the Right Solution for Me
• What are the computer and networking requirements

What is Digital Radiography?
• Sensors or phosphor plates take the place of traditional film.
• The clinician still uses an x-ray machine to provide the radiation exposure.
• And…

What is Digital Radiography?
• Radiographic images are acquired almost instantly and stored electronically.
• They can be manipulated, viewed, and transferred with a software program.

What Components are required for Digital Radiography?
• Sensors or phosphor plates to replace x-ray film.
• Imaging software that allows image storage and management.
• Computer system to run imaging software.
• Optional: Practice management software – for completely paperless patient records management.

Do It All – Right From the Patient’s Chart!
Is it Scary to Use Digital?

- It's easy.
- Sensors or phosphor plates take the place of your film.
- The big difference is that you now save your radiographs on a computer where you can see them any time.
Direct Digital

- Direct digital means, instead of using x-ray film, a sensor connects directly to your computer - the x-ray image displays almost immediately after taking it.
- Sensors use either a Charge Coupled Device (CCD) or a Complementary Metal Oxide Semiconductor (CMOS) to convert light into electrons. These are collected & turned into pixels that show brightness and contrast - that's what makes a digital x-ray image.
- You still use your regular intra-oral x-ray machine to take the exposure.
- Both CCD sensors and CMOS sensors work extremely well.

Indirect Digital (Phosphor Plate)

- Also works with your intra-oral x-ray machine. You still need this to provide exposure.
- Phosphor Plate works by trapping electrons in a phosphor layer until processed.
- Phosphor Plates look a lot like traditional film only they are slightly thicker and must not be bent.

Indirect Digital (Phosphor Plate)

- Phosphor plates are then fed into a special scanner.
- The scanner reads the images and then displays them on your computer screen – indirect digital.

Indirect Digital (Phosphor Plate)

- Several Manufacturers make scanner systems. They are different from one another, but they are all good.
- It may take several seconds to one minute for the scanner to read the images and upload them into your software system.
- Some scanners also erase the image as part of the process so the plate is ready for immediate reuse.
- Phosphor plates are erased by bright light.
- Once erased, Phosphor plates are reusable.

Are Chemicals Used to Develop Images?

- No! Chemicals are no longer necessary.
- This saves long-term expense in both purchase and disposal.
- Helps our environment.
Do I Need an X-ray Processor?

- No. Direct digital sensors immediately acquire the image into the software program.
- Phosphor plate images must be acquired through a small scanner. This takes seconds and also requires no chemicals.
- No more bulky processors with daylight loaders or dark rooms.
- If phosphor is used, the scanner may be placed on a counter in the operatory or centrally in the clinic.

What Kind of Intra-Oral Machine Do We Need?

- Standard intra-oral x-ray machines work with both direct sensors and phosphor plate.
- DC machines are better for digital imaging if you are investing in new machines.

So How Good Is a Digital Image?

What Does Image Quality Depends On?

- Your equipment and its features:
  - Sensor
  - USB controller, cable, and connection
  - Video card – brightness, contrast, gamma
  - Monitor dot pitch
  - Contrast ratio
  - Brightness and contrast adjustment
  - CRT vs. LCD

- How you use your equipment:
  - Exposure time
  - kVp
  - mA
  - Geometry – distance and angle
  - Sensor positioning

Image Quality Depends on:

- Your x-ray generator:
  - Cone length
  - Focal spot size
  - Signal collimation
  - AC or DC
Image Quality Depends on:

- Quality of Training
- Your patients’ cooperation

What Do Sensors Look Like?

Easy To Learn, Simple to Use

What are the Benefits of Sensors?

- Reusable. Replaceable plastic sheaths cover and maintain infection control.
- Great for going green: no more chemicals.
- Immediate acquisition of image.
- Reduced exposure to radiation.
- Transferable from room to room that has an IO X-ray machine for cost savings.
- No more x-ray development time - Increased productivity/significant savings to salaries.

Sensors (Direct Digital) Benefits

- Image easily manipulated/enhanced for diagnosis.
- Image can be as large as computer screen; explanations to patients easier to demonstrate.
- Can be electronically transferred to insurance or other provider without loss, without distortion of duplication, while still maintaining the image for reference.
- No more losing films/searching paper files for images. Time/frustration savings for DDS & assistants.

What are Other Considerations for Direct Sensors?

- Initial outlay is much higher than traditional film. However, cost neutral over 3-4 years with reduced salaries & no chemistry expense.
- Require training and practice to master.
- Bulkier. Requires practice but can be more comfortable with right technique.
- Image size is smaller than external casing.
- Sensors need to be handled with reasonable care for optimum life and ROI.
- Loss, breakage or theft makes for an expensive replacement. Accountability is important.
What are the Advantages of Phosphor Plate Systems?

- Use like traditional film: easier to learn.
- Plates can be used over & over.
- Reduced exposure to radiation.
- Approximate size of traditional film so able to use anywhere film can be used.
- Can upgrade traditional systems easily & cost-effectively (including Panorex - just replace the film with a phosphor plate).
- It’s easy to go “green”: No chemistry needed - cost savings.
- Faster than traditional film with images ready in seconds-salary savings, increased productivity.
- Images can be stored, manipulated, transferred, used in the same way that direct images are used.

What are Other Considerations for Phosphor Plate Systems?

- Requires scanner to process. Increased salary costs when compared to direct digital.
- Continued cost related to replacement of plates.
- Plates scratch causing artifacts on images & compromises DX: handle with care (manufacturers state that plates can be used 100s of times over. Fact: Careless handling causing scratches to plates. Reduces reuse to 50 exposures or less).
- Images take from 5 to 60 seconds to acquire through scanner.
- Plates should not be over-exposed to light. This will reduce their life.

What About Digital Panoramic?

- Many standard Panorex machines are upgradeable to digital.
  Note: Large investment - recommended only for machines less than 5 years old.
- If initial acquisition, consider a direct digital machine.
- Several well-priced models.
- Reliable, easy to use.
- Note correct use of lead apron.

Digital Panorex

- Position patients just as with traditional film.
- Image is acquired by software system.
- Economic conversions: With a phosphor plate digital scanner, digital conversion simply requires a phosphor plate instead of film.
- Note: Incorrect use of lead apron

What Else Do We Need For Our Digital System?

- Imaging Software
- Computer Hardware
- Network connectivity
- Practice Management Software (optional but necessary for paperless offices)
Imaging Software

- Essential to store and view images.
- Where your radiographs and other digital images “live.”
- Note: Imaging software is not Practice Management Software.

What Does Imaging Software Do?

- Can automatically organize images for viewing & diagnosis.
- Image features easily enhanced to improve diagnosis: contrast, magnification, texture, 3-D effects.
- Attach to electronic insurance claims without fear of loss.
- Transfer & store images right into patient electronic treatment file.
- Or individual radiography file if no practice management software.
- Images will not be lost with standard back-up (which should be done with all electronic records).

Feature Extraction

- Inverted
- Embossed
- Original

Helps Patient Education

- Enlarged images enable DDS to demonstrate diagnosis to patients.
- Improves understanding.
**Computer Hardware & Connectivity**

- Your office will need a computer operating system: Server, chair-side monitors and keyboards, networking and connectivity such as T1 lines.

**Networking**

- You may need to connect not only within your office but from one office to another.

**How Important is Network Design & Capacity?**

- Your network can transfer your images like this or...

**Dentrix Enterprise DEXIS 3MB+ WAN**

**The Master Plan: Key to Success**

- Have a Master Plan.
- From digital system types, to facility layout, to imaging software, to practice management software to networking - consult with equipment and IT specialists to assure desired results.
- When contracting for IT/networking services get expectations, scope of work & limitations in writing.

**Direct Digital vs. Indirect Digital Systems**

- Budget: Can you afford an initial direct digital investment?
- Budget: Does it allow you to optimally outfit your clinic?
- Do you have an existing network and if so what will work better on it?
- What will work best with your software plans?
- Which system will your staff embrace more readily (allow for comprehensive training)?
- Would you be more satisfied with the quality of the direct vs. the indirect image quality?
- How will each system type impact your clinical work-flow?
- If you are not sure, schedule demonstrations of each system type to assess desirability.
Which Direct Digital System?

- Some sensors are square and thinner.
- Some are rounded and wider.
- Some are a combination.
- Some have a single size to fit all patients.

We recommend:

- Consider customer service response & support.
- Consider warranty/replacement costs for breakage & replacement.
- Ask for network requirements & specifications in writing.
- Investing in the right system that works for you is essential
  - Base your decision exclusively on price when two choices perform equally in your opinion (in all other areas that matter).
- Don’t consider wireless yet.
  - Easier to accidentally throw away as it’s not tied down (literally).
  - Images are more subject to interference from other equipment such as ultrasonic cleaners.

Imaging Software

- Critical to digital performance.
- Software with the most features may not be the most appropriate.
- Go with the software that has the features you need and will use:
  - Transfer of images.
  - Storage of images.
  - Patient education.
  - Image Quality & Enhancements that will improve your diagnostic ability.
- Make sure it is very easy and intuitive to use.
- Remember:
  - It must work with your digital choice.
  - It must work with your practice management choice.

Think about your Layout & Workflow

- Running cable, T1 lines, etc. is an expensive part of your installation investment.
- Consider how you work:
  - Identify the best places for monitors/keyboards – especially for viewing and use in the operatory.
  - When considering best access, remember confidentiality.

Operatory Layout

Where is the best access to monitor and keyboards?
Where do We Begin?

- **Next Steps:**
  - Consultation with Henry Schein Special Markets Technology Manager
  - Computer network infrastructure review
  - Treatment room assessment and layout
  - Assessment of optimal digital requirements
  - Additional product review if necessary
  - Assessment of integration with practice management software (QSI)
  - Implementation plan