Digital Radiography in Dentistry

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Digital radiography gives dentists the option to replace film-based images with digital ones. Image sensors are positioned and exposed using conventional techniques. Once exposure is complete, the image is digitized, displayed on a computer monitor and stored in computer memory. Comparative studies have shown that the diagnostic quality of direct digital images approaches or exceeds that of conventional film in detecting occlusal and approximal caries, periodontal bone lesions, periapical bone lesions, and root canal systems.

If you need help accessing or understanding this information, contact AHS.VDHRadiologicalHealth@vermont.gov.

Advantages of Digital Radiography

- Images are immediately displayed when using direct digital sensors. This is important in endodontics, oral surgery and for effective patient education.
- Digital sensors are reusable.
- Darkrooms, developing solutions, and conventional film developers are no longer required, which also reduces the disposal costs for the chemicals.
- Patient dose may be reduced by up to 80% with digital radiography compared to conventional film.
- Digital radiographic images are easily stored on the computer and can be transmitted in digital form to other clinicians within minutes.
- Digital imaging allows you to alter image properties by:
    - Optimizing image density (brightness) and contrast to rescue or enhance an image where exposure conditions were not optimal.
    - Magnifying the image.
    - Reversing the image to view it like a photographic print.
    - Enhancing color and superimposing various textures on images to make edges clearer.

Disadvantages of Digital Radiography

- Replacing conventional radiography with digital imaging can be costly.

- Most sensors are thicker (3 to 5 millimeters) and more rigid than conventional film, which may make intra-oral positioning difficult.
- Items used with direct digital radiography that may become contaminated and cannot be heat-sterilized (such as the x-ray sensor, connecting cord and computer equipment) need to be covered with protective barriers during patient treatment or imaging.
- Due to the lack of universal use of digital radiography, transmission of digital radiographs to another facility may not be possible. Printer images are lower quality than the digital radiograph and should not be considered diagnostic images.
- The dose reduction realized by digital radiography is not clear. Digital systems have a broad exposure latitude and can provide good images even when the exposure time has been much greater than required. As a result, the patient may receive a higher dose than necessary for a diagnostically useful image, and the user is not warned by image darkening that the exposure time is too lengthy. Operators should use the lowest settings that will provide a good diagnostic image.
- Clinicians may tend to decide sooner to repeat an exposure with digital radiography than they would have with film radiography. This is probably because it does not require as much time to take another digital radiograph.