

Editorial

Digital Radiology in dental clinics

With the technological advancement, dental radiology renews every day. The conventional radiograph that uses the radiographic film and image processing has been replaced gradually by image sensor or receptor and computer screen.

The digital image is formed by a set of small units so-called pixel (picture element), but not more by silver halide crystals. The pixels correspond to the small unit or information point on the digitized image.

The acquisition methods of the digital radiographic are: charge couple device sensor (CCD), complementary metal oxide semiconductor (CMOS), and phosphor storage plate (PSP). Basically and briefly, CCD and CMOS systems have an intraoral radiologic sensor coupled to a computer through cable, while PSP systems capture the image through phosphor salt plate. Both image receptors absorb the x-ray beam and emit light and electric power to obtain the digital image, according to the photo-electric principle.

The CCD or CMOS sensors convert the x-ray beam into light and electrical pulses that are conducted through cable and converted into digital signs by a specific software. The image appears almost instantly. Depending on the manufacturer, the sensor has different shapes, sizes, and thickness. The difference between the CCD and CMOS technology is the low energy consumption and reduction of the system size of the latter over the former.

In PSP system, after sensitization, the phosphor salt plate stores the x-ray photon energy and it is inserted into a device that will read the latent image through laser beam. Thus, the analogical image is scanned and converted into digital image. The plates should be stored into specific reusable protector packings with sizes and thickness similar to that of conventional radiographic films. The information is easily erased by focusing a visible light source.

Considering the notorious technological advancement, the dentist should decide about choosing between conventional and digital radiograph. And choosing digital radiograph, which system and manufacturer would be better.

Despite individual issues, the dentist should always keep in mind the practicability, mobility, and cost vs. benefits. CCD or CMOS sensors are difficult to place because of their rigidity, thickness, and the cable. PSP sensors are flexible and do not demand a cable. Also, CCD and CMOS sensor demand longer exposure time, show smaller area of the image appearance, and cause more repetitions due to the discomfort to patient. However, these sensors occupy small space, the image is instantaneous, and the cost is reduced. On the other hand, the PSP system has a greater image resolution and small details are seen more easily. PSP system occupies more space and has greater cost.

Currently, it is consensus that the digital image makes the diagnosis and interpretation easy. To help the decision of doubtful dentists, not only the image quality and high resolution, but also practicability, reduced time to acquire the image, and treatment optimization should be evaluated. Moreover, it is important to consider the reduction of the environmental impact generated by the use of radiographic films and solutions for radiographic processing. Regardless of the choice of the receptor system, digital radiology is a reality strongly present with no turning back.

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