

The Benefits of Digital Radiography

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Digital radiography has quickly become one of the fastest growing technologies. The argument between digital radiography versus conventional film-based radiography is quite understandable when looking at the inherent advantages of digital radiography systems and the time many clinicians have already devoted to film-based systems. The benefits from the use of digital radiography in endodontic therapy are numerous, with the ability of the clinician to enhance the contrast and brightness of images, magnify the apical zone, transmit and store images with ease, eliminate the use of chemicals, improve patient education, enhance diagnosis and, most importantly, to reduce considerable patient exposure to radiation. Many clinicians are still wary, however, and are willing to continue using conventional radiography regardless of its disadvantages, such as occurrences where minor degrees of resorption may not be visible, overlapping by adjacent anatomical structures that can obscure the clarity of the image, and higher doses of radiation that pose higher risks to patients.¹

Much of the desire to continue use of conventional film radiography is due to fear of the unknown and clinicians' misconception of initial cost versus overall financial return. The accuracy of working-length measurements determined by

film radiographs versus measurements determined by digital radiographs can also prove to be a factor in one's decision between film and digital systems. Several studies have been conducted to examine the efficacy of both systems and how they determine accurate working length.

A study by Lamus et al compared the efficacy of digital and conventional radiography for root-canal length measurement. Their results demonstrated no significant difference between digital and conventional film measurements; both were equally accurate in their determination of working length (ie, less than 1 mm different from direct measurements of the extracted teeth).² These findings corroborate those of other investigators,^{1,3} who have found no significant difference in measurement of working lengths between film and digital radiography. Of importance, however, is that subjects in the study by Woolhiser et al did show a preference for the *quality* of enhanced digital images.³ Subramaniam et al also compared the measurements from conventional film and digital radiography to measurements from tactile sensation and an electric apex locator. While there was no significant difference in measurement between all four modalities, the measurements *best* related to the actual

canal length were those determined through the use of an electric apex locator and digital radiography.¹

From the results of these studies, one can assume that the ability to determine an adequate working length is equal between film-based and digital radiography. With both systems standing on equal ground in this sense, the endodontist has no choice but to compare the more apparent differences of both systems: digital radiography produces higher quality images at less risk to the patient and reduces the cost factors involved. By switching to digital radiography, clinicians can save on film expenses, chemicals and their disposal, mounts, processor maintenance, and developing time, thus achieving a significant return on investment. Through the guidance of experienced manufacturers or distributors, one's investment in digital radiography can be properly managed and thus result in a more seamless integration of the technology into daily practice.

CONCLUSION

All things considered, it should be apparent to clinicians that digital radiography is a valuable investment. With the new innovations (eg, wireless sensors, image management, diagnostic software) continually being developed by manufacturers, digital radiography will be a valuable component of dental practices. ■

REFERENCES

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3. Woolhiser GA, Brand JW, Hoen MM, et al. Accuracy of film-based, digital, and enhanced digital images for endodontic length determination. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2005;99(4):499-504.

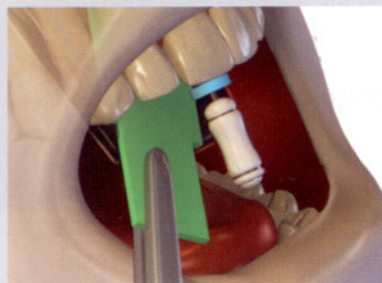


Figure 1. To take an endodontic image, place the green tab onto the sensor and clip with a hemostat. Instruct the patient to maintain the position.

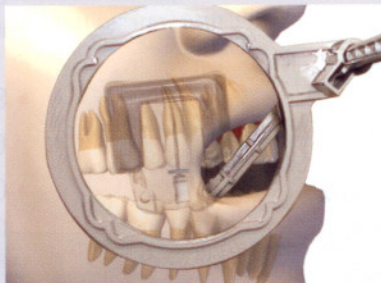


Figure 2. Proper use of the endodontic basket with the Endo Ray holder. The adhesive holds the basket to the sensor. The arm and ring can be attached for greater accuracy and the rubber dam released from the frame for access.