

Summary of: Digital images obtained with a digital camera are not associated with a loss of critical information – a preliminary study

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VERIFIABLE CPD PAPER

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Online article number E9
Refereed Paper – accepted 19 December 2009
DOI: 10.1038/sj.bdj.2009.182
©British Dental Journal 2009; 206: E9

Aim To investigate whether digital images obtained by a digital camera are deficient compared to the original radiographs. **Materials and methods** Twenty pairs of bitewing radiographs of children and 40 anterior periapical radiographs were photographed using a digital camera. Images were saved as JPEG files and loaded onto a laptop. Film radiographs and digital images as scanned and after adjustments were evaluated for proximal caries and for periapical pathologies. **Results** A not statistically significant higher number of proximal lesions were observed on plain-film and enhanced digital images than on unenhanced images. Enhanced digital images resulted in significantly more diagnoses of external root resorption compared with conventional radiographs. Pulp canals appeared significantly more abnormal (obliterated or enlarged) in digital images compared with film radiographs. **Conclusion** Storing existing radiographs in a digital medium for space saving purposes using a digital camera does not lose critical information. **Clinical implication** Clinicians can use digital cameras to digitise and store radiographic images without losing important diagnostic information.

EDITOR'S SUMMARY

The advance of technology often seems to bring with it the mixed blessings of curse and cure. Frequently we are just getting used to some piece of equipment or understanding how a process works when the instrument is changed for an upgrade or a system is replaced by a newer version. In due course we become familiar with the alternative, which may or may not be more efficient and provide better quality or value, and life continues on albeit with an intervening frustration.

One particular aspect of advancing technology is that of recording and archiving. How many of us have a tape recorder of some sort in the loft I wonder? A reel-to-reel perhaps, a cassette recorder/player or the rather more rare cartridge system. Then there are the 'records' and albums somewhat disparagingly referred to as 'vinyl', a trail of materials now redundant due to the difficulty of accessing their contents.

Professionally the same problem surfaces with the move from paper patient records to electronic and specifically in the field of radiography from film to the digital medium. How to store previous 'hard' copies in an electronic form for the purpose of future reference as well as to reduce the physical space required to house them? This paper tests a very practical way of possibly overcoming these problems by using a digital camera to take pictures of radiographs and finds that, within the limits of the study, it is an accurate and acceptable method for use in dental practice.

However, electronic storage of records is not likely to end with patient notes and radiographs. With the increasing use of scanning devices for measuring cavities and constructing restorations, intra-oral cameras for imaging and other visual-mediated technologies, the chances are that we may in future be making holograms of orthodontic models for exam-

ple. The advantages of which include having more space in the loft to store those outmoded DVD players and plasma screen televisions.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 206 issue 5.

Stephen Hancocks,
Editor-in-Chief

DOI: 10.1038/sj.bdj.2009.185

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IN BRIEF

- In a digital, paperless era, clinicians need to decide whether and how to store old radiographs.
- Film radiographs can be digitised simply by using a digital camera.
- Storing existing radiographs in a digital medium does not cause loss of critical information or alter treatment decisions.

COMMENT

The use of digital radiography is becoming more widespread, because it offers speed, convenience, image manipulation and is a valuable tool of communication. The increased use of computerised records and the goal of the space saving 'paperless office' require the transfer of conventional film radiographs into digital form for archiving. Digitisation can be achieved either with the use of scanners or with digital cameras.

While comparison of film radiographs with their scanned equivalents has been reported, studies using digital camera are rare. As many dental practices have digital cameras as part of the armamentarium for recording clinical information, this study will therefore be of interest to readers.

The authors used bitewing and peri-apical radiographs taken in practice using film holders and then photographed them with a good quality digital camera. The digitised images were then enhanced by altering the contrast and brightness. A number of key features, among them caries and peri-apical pathology were then compared between the three recording modes.

Perhaps not surprisingly, the differences between the films, the unaltered digitised images and the enhanced ones were not considered significant. Interestingly the enhanced images resulted in significantly more diagnoses of external root resorption and PDL enlargement. The authors recognise the limitations of the study. Observation was carried out by two observers.

No mention was made of whether or not evaluation was made by the observers more than once, since intra- as well as inter-observer variation is well recognised when evaluating radiographs.

The authors also mentioned a lack of standardisation, having no gold standard against which to make evaluations. This exposes a far deeper problem in that it is not only the interpretation of radiographs that is subjective, but also the taking. Variables such as size of sensor or film, orientation, vertical and horizontal angulation and exposure can have infinitely more impact on the quality of the image and its diagnostic value than how the image is stored. Notwithstanding the above, this study should give reassurance to those embarking on the task of transferring film images on to digital records using a digital camera, that this should result in no loss of clinically important data.

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AUTHOR QUESTIONS AND ANSWERS**1. Why did you undertake this research?**

We undertook this research because of a real need: dentists who move to paperless patient files and to digital radiography face a dilemma whether to keep their old film radiographs (for future comparisons or just for the records in paper folders), or to store them in a digital medium thus saving space. Since digital cameras are nowadays in the possession of nearly every clinician, the question of digitising the film radiographs using a camera has become a relevant issue. While the literature provides data regarding comparisons after scanning film radiographs with flatbed scanners, it lacks information about digitising film radiographs with a digital camera. Obtaining the images with a digital camera seems simple and easy to perform, and therefore may be a good solution to digitise film radiographs.

2. What would you like to do next in this area to follow on from this work?

We are very much interested in further investigating the diagnostic performance of film radiographs and their digital images. Therefore, our next step will be performing *in vitro* and *in vivo* studies where these modes of radiography will be investigated for their diagnostic performance.