Can we improve radiological diagnosis of periapical inflammation?

The influence of viewing conditions on radiological diagnosis of periapical inflammation by N. Patel, V. E. Rushton, T. V. Macfarlane and K. Horner Br Dent J 2000; 189: 40-42

Objectives
To determine the effect of viewing conditions upon diagnosis of early periapical inflammatory pathosis on intra-oral radiographs, and to examine the effect of observer experience upon diagnostic performance in this task.

Methods
50 observers examined 18 periapical radiographs using three different viewing conditions (room lighting; viewing box; viewing box with x2 magnification and masking). Their diagnoses were compared with an 'expert' diagnosis provided by repeated viewings of the films by two dental radiologists. Sensitivities and specificities were determined.

Results
When 'ideal' viewing conditions were used, optimal sensitivity (78%) and specificity (78%) were obtained. Use of a viewing box was associated with significantly higher specificity than the use of room lighting ($P = 0.0016$). Use of masking and x2 magnification was associated with significantly higher sensitivity than a viewing box alone ($P = 0.004$). There were few significant differences in diagnostic performance between observers, but qualified dental staff had significantly higher specificities than 4th year ($P = 0.01$) and 5th year ($P = 0.01$) students when a viewing box was used alone.

Conclusions
This study on early periapical inflammatory pathosis gives support to guidelines which recommend the use of a viewing box, x2 magnification and masking for interpreting intra-oral radiographs. It also suggests that observer experience may influence interpretation of early periapical pathosis.

In Brief
- Guidelines suggest that a viewing box, masking of peripheral light and magnification should be used when examining intra-oral radiographs.
- This study examined the influence of viewing conditions on the radiological diagnosis of early periapical inflammation.
- 'Ideal' viewing conditions offered the best combination of sensitivity and specificity in diagnosis of early periapical inflammation, supporting current guidelines.
- Students tended to diagnose healthy teeth as diseased (lower specificity) more often than qualified dentists did when a viewing box was used.

Comment

Many of our daily practices and procedures are based on common sense and informed by evidence that may support an aspect of that procedure. A properly constructed trial, however, examining a complete process in a clinical setting adds weight and integrity to any practice. Thus for some time it has been recommended that radiographs should be viewed under transmitted light from a well-constructed viewing box, that light be masked off from around the edges of the radiograph and that the film be examined under magnification. Anyone trying this for the first time will be struck by the difference this makes to the clarity of detail on a radiograph, but this is a subjective impression and it would be right to ask if this has a measurable effect on diagnosis.

Patel, Rushton, Macfarlane & Horner seek to place one more piece in the puzzle of modern evidence-based dentistry by examining how the conditions for viewing intra-oral periapical radiographs affects the diagnostic accuracy of the radiological interpretation of early periapical inflammatory disease. They compare success in identifying periapical change when radiographs are viewed under three different conditions; when held up to room lighting (or perhaps the nearest available window), viewed on an unmasked viewing box or when viewed on a masked viewing box with x2 magnification. Those radiographs viewed surrounded by a dark mask and with magnification gave the best sensitivity and specificity (78%), a significantly better result than a viewing box alone, and that in turn significantly better than those held up for viewing against normal room lighting. They conclude that there is tangible benefit to be had by the use of proper viewing conditions. Their results also draw attention to the conclusion that the degree of clinical experience of the observer can have on accuracy of radiological interpretation. This study fits another useful piece in the puzzle of modern evidence-based dentistry.

The recently introduced Ionising Radiations Regulations 1999 now require all dental practices to adopt a radiographic quality assurance programme, aiming for consistently high quality films. Correct viewing of the radiograph forms a crucial last stage in this process, ensuring the maximum diagnostic yield from each film and therefore the most benefit to the patient.

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