

Clinical decision-making — can a computer aided learning package help?

Evaluation of computer aided learning in developing clinical decision-making skills by E. J. Kay, B. Silkstone and H. V. Worthington *Br Dent J* 2001; 190: 554-557

Aim

The aim of this study was to determine whether an educational intervention delivered by a computer aided learning package improved the sensitivity and specificity of dentists' restorative treatment decisions.

Method

The study was a randomised controlled study using a Solomon three-group design. Ninety-five dentists were randomly allocated to the three study groups. One group of dentists read the radiographs pre and post an educational intervention, a second group read the radiographs once, after the intervention, and a third group read the radiographs twice, but received no intervention. On each occasion the dentists read 24 surfaces on each of 15 radiographs and made 360 decisions on how certain they were about restoring the tooth surface. Comparisons of mean sensitivity, specificity and areas under ROC curves were made within and between the study groups. Kappa values were used to assess changes in the level of agreement between dentists.

Results

There were no significant changes in sensitivity, specificity or area under ROC curves caused by the intervention. There was no

evidence that the level of agreement between the dentists improved after the intervention.

Conclusion

A computer aided learning package had no effect on dentists' treatment decision-making behaviour.

In Brief

- Education about uncertainty, delivered by a computer aided learning package, has no effect on the dentists' treatment decision-making.
- The use of computer aided learning may not be having the required effect on clinicians.
- Randomised controlled trials comparing different teaching methods need to be undertaken, particularly with regard to decision making.
- Education of dentists should be as much underpinned by research as treatment.

Comment

Almost 20 years ago Richard Elderton and myself described clinical decision-making in dentistry as largely idiosyncratic.¹ In the ensuing time there is little evidence that any great changes have occurred to review this opinion. Indeed mounting evidence only seems to confirm the lack of a systematic basis underlying the lack of reliability or validity of treatment decisions made by dentists. Bader and Schugars have since suggested that dentists may not use a hypothetico-deductive process for the diagnosis of caries but instead use something like 'illness scripts'.² In this view treatment criteria used in the clinical setting are viewed as a complex, chaotic and poorly understood (by the dentist involved) use of remembered cues and signs which for one reason or another have relevance to a dentist. Clearly, if this is the case, there is a need for

the development of much more formalized 'scripts' for dental restorative treatment.

However, rather than simply trying to 'calibrate' dentists to make treatment decisions according to given formal definitions of what constitutes a condition in need of treatment (which evidence suggests is a tactic that might be doomed to failure) Kay, Silkstone and Worthington adopted a more novel approach. They used a computer aided learning package to encourage the dentists who took part to consider the surrounding issues and the consequences of their treatment decisions. The efficacy of this was tested using the now well worn but immensely valuable set of dental radiographs that Kay generated from extracted teeth which could, after the radiographs were taken, be examined in fine detail to determine

their 'true' dental condition. The finding that this intervention failed to improve the reliability and validity of treatment decisions made on the basis of the radiographic evidence is perhaps more indicative of the difficulties involved in trying to rationalise treatment decision making, rather than stemming from the technique of computer aided learning.

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1. Elderton R J, Nuttall N M. Variation among dentists in planning treatment. *Br Dent J* 1983; 154: 201-206.
2. Bader J D, Shugars D A. What do we know about how dentists make caries related treatment decisions? *Community Dent Oral Epidemiol* 1997; 25: 97-103.